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EFFECT OF TOXIC SUBSTANCES ON THE BLOOD-FORMING ORGANS

WITH SPECIAL REFERENCE TO THERAPEUTIC DRUGS*

BY

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The amount of a drug which will produce a therapeutic, toxic, or lethal reaction varies in different patients or animals. With certain poisons, such as digitalis, the range of variation is small; with others, such as dysentery toxin or the barbiturates, the range is wide. For a given poison the toxic symptoms are the same however much the dosage required to produce them varies in different individuals. Those who are poisoned by an unusually small dose of the substance may be said to be susceptible to it or tolerate it badly. Dudley[1] has described a striking demonstration of variation of susceptibility in a British submarine crew during the war. While the submarine was submerged there was an escape of arsine gas from the storage batteries, and the crew of thirty men, all selected for physical soundness, were exposed to exactly the same amount of arsenic for exactly the same length of time, yet they differed markedly in their response to it. One was not affected at all; seven had anaemia and jaundice (the severest case had a count of 1,980,000 red cells); the rest had symptoms of anoxaemia, but not severe enough for hospital treatment.

In susceptibility or intolerance the symptoms are the usual ones of overdosage with the particular drug. A small minority of individuals, however, react to certain drugs in a wholly abnormal manner which is properly called idiosyncrasy. Idiosyncrasy is a peculiarity of constitution whereby the individual reacts differently from the majority of mankind. The symptoms are different from the ordinary symptoms of overdosage and they cannot, as a rule, be reproduced in animals. Susceptibility shades gradually into normal tolerance and insusceptibility, and if we chart the amounts of a drug necessary to produce toxic symptoms in a large number of people we obtain a regular distribution curve similar to a diagram of variations in height or weight. Idiosyncrasy, on the other hand, is sharply demarcated. The published figures of the amounts of arsenobenzol, amidopyrine, and gold which have induced changes in the blood appear rather uniformly small, and after a certain total quantity of the drug has been administered the risk of the idiosyncratic type of reaction progressively diminishes.[2,3] The difference between susceptibility and idiosyncrasy can be illustrated by reference to amidopyrine.

Amidopyrine Susceptibility and Idiosyncrasy

The usual symptoms of overdosage with amidopyrine are sleepiness passing to stupor, rapid heart beat, hyperpnoea, cyanosis, sweating, and collapse. The fatal dose is about 8 grams. If symptoms of this type occurred with a dose much smaller than 8 grams we should describe the patient as susceptible to amidopyrine. In certain individuals as little as 0.2 gram may produce an alarming and entirely different train of symptoms. The individual shivers and feels indisposed. The temperature rises and there is an abrupt fall in the number of white cells in the blood. Fatal agranulocytosis has more than once followed the administration of as little as 1 gram of amidopyrine over a short period of time. These symptoms are obviously different from the usual manifestations of amidopyrine poisoning and are best explained as idiosyncrasy. I wish to stress the importance of variable susceptibility and idiosyncrasy as it is still not generally appreciated. Only recently the following expert testimony was reported[4]:—

"It was not conceivable that the condition disclosed by the autopsy could have been caused by the occasional use of amidopyrine . . .

"The urine had been almost clear, whereas in a case of amidopyrine poisoning it would have been a brick red."

Both statements overlook the possibility of idiosyncrasy. Experience and statistical calculations show that the susceptibility of mankind to drugs varies within much wider limits than has been realized in the laboratory and in the law courts. Idiosyncrasy makes unreliable any calculation of dosage or prediction of symptoms from animal experiment and can only be discovered by unbiased observation of the experiment of large-scale employment in man. It appears to need at least ten years' extensive use before the harmful properties of a new drug or an industrial hazard can be assessed.

Gold Preparations

We are only now beginning to appreciate the haemotoxic properties of gold, which has been widely used for tuberculosis since Moellgaard's[5] paper in the *British Medical Journal* in 1925, and for rheumatism since Forestier's[6] paper in the *Lancet* in 1932. Blood dyscrasias have been observed with different preparations of gold, and they appear to be caused by the gold, and not by the sulphur

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or the benzene ring which some of the salts contain. Mercury and silver may exert a similar action on the marrow.[7] The preparations used contain as a rule between 30 and 50 per cent. of gold. In tuberculosis it is customary to inject sanocrysin (syn. crisalbine, $Au(S_2O_3)_2Na_3$). The initial injection is 0.1 gram, increased at weekly intervals to 1 gram, and a course totalling about 6 grams is given in six or seven weeks. In rheumatism solganol-B oleosum, an oily suspension of aurothioglucose is used; injections of 0.05 to 0.2 gram are given at weekly intervals until a total of 2 grams has been given. In tuberculosis and in rheumatism courses of gold treatment are repeated several times with intermissions of two or three months. When gold treatment was first introduced, much larger doses were given, up to 1 centigram per kilo of body weight for several days in succession. The ordinary symptoms of overdosage are fever, malaise, albuminuria, stomatitis, vomiting, diarrhoea, erythema, exfoliative dermatitis, and focal reactions in the disease under treatment.

In 1932 Emile-Weil and Bousser[8] collected thirty-two cases of haemorrhagic disease following gold treatment, and in 1935 Braillon[9] collected twenty-six cases of agranulocytosis following gold treatment. In addition to purpura and agranulocytosis, aplastic anaemia, leukaemia,[10] excessive leucocytosis,[11] and punctate basophilia[12] have been attributed to gold. The haemotoxic accidents of gold therapy are quite different from and are not accompanied by the ordinary symptoms of gold poisoning. It is impossible to produce a haemorrhagic state or agranulocytosis by injecting gold subcutaneously or intravenously in animals. Moreover the majority of these accidents have been after moderate doses of gold, well within the usual therapeutic limits, and during a first or second course of treatment. Various warning signs such as eosinophilia and leucopenia are described and it is obviously desirable to examine the blood at frequent intervals when gold is administered. It must be remembered, however, that eosinophilia and leucopenia occur in untreated asthma and arthritis, and a fatal blood dyscrasia may appear without any previous alteration in the blood picture. Severe haemorrhage may occur when the platelets and the bleeding time are normal and the tourniquet test is negative. It is exceedingly doubtful whether these accidents can be prevented by the simultaneous administration of calcium, as has been suggested. The accidents of gold therapy are therefore not due to carelessness or overdosage and must be attributed to idiosyncrasy. The frequency of such an idiosyncrasy is estimated by Braillon[9] as 1 per thousand, but it may be noted that it occurred in three of Hartfall and Garland's series of 100 arthritic patients treated by gold. It is rare for a blood dyscrasia to develop within a fortnight of beginning treatment and the interval for sensitization may be much longer. The total dosage required for sensitization may be very small, as shown by the figures in the following table, which I have compiled from the published reports most easily accessible.* This shows that in 50 per cent. of the patients who develop a blood dyscrasia from gold the total dosage has been less than 2 grams, and in 75 per cent. it has been less than 4 grams of gold salt.

Total Dosage of Gold Salt	No. of Cases of Blood Dyscrasia
0.00—0.49 Grams	8
0.50—0.99 ,,	7
1.0 —1.99 ,,	10
2.0 —3.99 ,,	11
4.0 —7.99 ,,	7
8.0 — ,,	4

* This table is based on references 9, and 13 to 27 inclusive.

Nature of Idiosyncratic Reaction

The causes of unusual susceptibility and idiosyncrasy to a drug are obscure. Drug idiosyncrasy seems to have no aetiological relation to the toxic idiopathies or asthma-eczema-migraine group of diseases.[28] A hereditary liability is suggested by the occurrence of agranulocytosis in different members of the same family.[29 30] Females more often develop agranulocytosis, toxic purpura, and aplastic anaemia from chemical agents than males, but they are probably more exposed to risk in health and sickness. Ohlsen[31] passed through three attacks of agranulocytosis—two after amidopyrine and one after gold. Tzanck's[32] patient developed purpura haemorrhagica after arsenobenzol treatment at age 23, and again after gold at 31. These observations suggest a constitutional predisposition, but probably once the marrow has been damaged it is more vulnerable to other poisons. Local predisposition may also be important: women who have always bruised easily have been thought to be more liable to toxic purpura from gold, and the predilection of agranulocytosis for middle-aged women may be associated with the frequent occurrence of moderate leucopenia in the same group. The disease for which the treatment is given may have an influence, and some have thought that the blood-forming organs are more likely to suffer damage from the use of gold in rheumatoid arthritis than in tuberculosis.

In some cases of idiosyncrasy, such as agranulocytosis from amidopyrine, a mechanism akin to anaphylaxis is present, an initial dose being necessary to sensitize the patient. A certain total quantity of amidopyrine, which is usually relatively small, must be ingested before this sensitization develops. The abrupt fall in the white cells when amidopyrine is ingested by the sensitized subject—sometimes preceded by a brief leucocytosis—is an explosive phenomenon which is strictly comparable to the diminution of the white blood cells in patients with food allergy.[33] Efforts have been made to obtain skin reactions by injecting the drug or mixtures of the drug with serum intradermally,[34] but one would hardly expect skin reactions to be any more constant or reliable than in other forms of alimentary allergy. An allergic type of reaction has also been demonstrated in thrombocytopenic purpura due to drugs, a close analogy with thrombocytopenia due to food allergy.[35] The allergic reaction to haemotoxic drugs is seen most clearly in amidopyrine agranulocytosis and in the purpura due to sedormid[36 37] and quinine,[38] but there is a very considerable field for experiment in discovering how often haemotoxic reactions are allergic and repeatable under controlled conditions, and in studying the exact details of the reaction by serial blood counts and examination of the bone-marrow by sternal puncture.

In a man of 61, who had taken the hypnotic sedormid (allyl-isopropyl-acetyl-carbamide) at frequent intervals for some months, an attack of thrombocytopenic purpura could be induced at will by giving 0.12 gram sedormid.[36] Maritschek and Markowicz's[39] patient was a man aged 35 who had suffered from "quinine intoxication" during treatment for malaria, fifteen years prior to coming under observation. The symptoms at that time were purpura and haemorrhages from the mucosae, and the usual manifestations of quinine intoxication were absent. There remained a persistent hypersensitivity to quinine, so that even small doses (0.3 gram) produced severe thrombocytopenia. McCarthy and Wilson[40] reported a case of thrombocytopenic purpura following arsphenamine. After recovery from the first attack the patient again received a small amount of the drug (0.1 gram). At the end of half an hour there was a slight chill with immediate development of purpura and bleeding from the gums

Incubation and Duration

For various reasons, such as the time taken for sensitization to develop, or for toxic substances to accumulate to a critical level in the body, or for repeated injuries to exhaust the reserve forces of the organism, signs of injury to the blood-forming organs may not be detected until the individual has been exposed to a toxic substance for some time or indeed until after exposure has ceased. It seems that injury to the marrow, once started, may progress without further intoxication. Alice Hamilton[41] quotes several instances in which symptoms of benzol anaemia did not appear until after the workers had left the factory. In one of Hartfall and Garland's cases[13] agranulocytosis developed three months after the last injection of gold. In one of my cases agranulocytosis developed two months after the last dose of amidopyrine. It is not known how long amidopyrine sensitivity lasts, but certainly for years, and possibly for life. As already indicated, the depression of blood formation induced by a substance like benzol may proceed inexorably to complete aplasia of the marrow and to death long after exposure has ceased, and despite all treatment. If death does not occur, months may elapse before the blood is restored to normal, and cases such as those of Ohlsen[31] and Tzanck[32] make one wonder whether recovery is ever really complete. In patients with agranulocytosis it is usually six to twelve months after suspension of amidopyrine before the white count is stabilized at a normal level, and doubtless much longer before the ability to produce a maximal leucocytosis is regained. The toxic purpuras usually recover more rapidly, but Secher[22] describes a case in which thrombocytopenia following gold treatment had persisted for six months at the time of writing. A severe aplastic anaemia is usually fatal, but a few cases have recovered after repeated transfusion over a period of years. The case of hyperchromic anaemia in a benzol-worker reported by Emile-Weil and Lehmann recovered rapidly on liver therapy only.[42] The case of aplastic anaemia due to benzol reported by Hayhurst and Neiswander recovered after six transfusions given over a short period.[43] Knott's case of aplastic anaemia from arsenobenzol resulted in death from pneumonia after receiving fifty-two blood transfusions in a period of eighteen months.[44]

Classification

In the past attention has been too exclusively centred on the changes in the circulating blood, and insufficient attention has been paid to the marrow. This gap in our knowledge should be filled now that we are becoming more accustomed to puncture or trephine the sternum during life. The same blood picture may be associated with quite different appearances in the blood-forming organs, and in particular we are beginning to realize that an aplastic blood picture may be associated with a marrow which is hyperplastic but fails to deliver new cells into the circulation. It is a mistake to regard the blood disorders produced by chemical substances as different from other blood disorders. There are striking resemblances between the changes in arsenobenzol purpura and infective endocarditis; between the bone-marrow in malaria and in radium poisoning. Classification of the lesions must be regarded as arbitrary, for they shade indefinitely into one another or are combined in varying degrees. The same drug may produce different lesions in different people or at different periods after exposure in the same person.

Out of seventy-seven blood counts in benzol poisoning there were seventeen with a blood picture such as one sees in benzolized animals—that is, a leucopenia far in excess of the anaemia; but there were twenty-two with the reverse—excessive anaemia with moderate leucopenia or a normal white count. Typically the red cells should present a perfectly negative picture, but this is not always true. We may find abnormalities of size, shape, staining properties; we may find stippling, and even nucleated red cells. A review of seventy-five cases shows that while the colour index was low in seventeen, in twenty-two it was high, and in thirty-six it was normal. Haemorrhage is usually a conspicuous feature, but it is not invariable. The marrow is not always aplastic; it may show hyperplasia, but with a failure to deliver the new cells into the circulation.[41]

It is convenient to divide blood poisons into those which act on the peripheral blood and those which act on the marrow. The division is not hard and fast, and many substances act in both situations. In benzol or gold purpura, haemorrhage may occur without any change in the platelets or bleeding time, suggesting that the endothelium is involved. When amidopyrine is taken by the sensitized individual the white blood count falls spectacularly, suggesting that the drug acts on the circulating cells as well as on the leucopoietic tissue. I do not propose to discuss in detail the haemolytic and haemotoxic poisons which act on the circulating blood and produce according to their nature anaemia, methaemoglobinaemia, or polycythaemia. Arsine, toluylenediamine, and lead are the most important of the haemolytic agents, the aniline compounds the most important of the haemotoxic, but the ingenuity of the chemist is constantly adding new members to the series. The reactions of the marrow can be briefly tabulated as follows:—

1. Regenerative hyperplasia, as after haemorrhage or arsine poisoning.
2. Dysplasia, in which the marrow is cellular, but the ripening of the cells is imperfect and few are delivered into the circulation.
3. Neoplasia—that is, leukaemia.
4. Aplasia.

Dysplasia

Any over-elaboration of this classification would be merely an academic exercise, more especially as reliable data on the morbid anatomy of the marrow are scanty and the lesion is often a mixed one. In the majority of cases in which marrow activity is inhibited but not destroyed, the number and proportion of the different cells is the same as in health, but various degrees of degeneration may be found in the cells according to the severity of the lesion, the freshness of the material, the refinement of the staining, and the self-confidence of the pathologist. These are the same changes as are familiar to us in other organs under the title of parenchymatous degeneration, and they may affect more severely the megakaryocytes or the myelocytes with consequent purpura or leucopenia. In this category I should place the usual acute effects of benzol and its derivatives, arsenobenzol, dinitrophenol, nirvanol, thorium dioxide, and gold. If the patient survives the acute attack, the marrow more or less rapidly recovers, but this is not always the case, for sometimes a lasting torpor or paralysis may ensue, in which few blood cells are produced by the marrow, although it appears relatively normal to the naked eye and to the microscope.

It has only recently been realized how often a progressive anaemia of aplastic type proves at necropsy to be associated with a marrow of normal or increased cellularity.[45] I prefer to describe this type of dysplasia of the marrow as pseudo-aplastic anaemia. The erythropoietic tissue is more resistant than the leucopoietic tissue or the megakaryocytes, and when the formation of red cells is inhibited there is usually depression of white cells and platelets also. Israëls and Wilkinson[46] have designated

"achrestic anaemia" (formerly "achresthic") certain cases of anaemia with megalocytosis and hyperplastic marrow which do not respond to liver, implying that they are caused by inability to utilize or mobilize the material needed by the pernicious anaemia patient. I have already mentioned that a megalocytic anaemia and hyperplastic marrow may occur in benzol poisoning, and I do not like the term "achrestic anaemia" if it implies that these conditions have a real affinity to Addison's anaemia. The few examinations of the marrow we have made in patients who answer the criteria of "achrestic anaemia" have shown a cellular marrow with many large erythroblasts, but in spite of a considerable megalocytosis there were none of the primitive megaloblasts (haemocytoblasts) which are so typical of pernicious anaemia. It is probable that any of the poisons which produce aplasia of the marrow can also arrest the maturation of the cells without actual necrosis and aplasia, and produce a pseudo-aplastic anaemia.

In the usual form of dysplasia, red cells, white cells, and platelets are involved together, though in varying degree, and the cytology of the marrow does not differ greatly from the normal. This is not always the case. The agranulocytosis produced by amidopyrine is a lesion strictly limited to the white cells and the leucopoietic tissue; the erythropoietic tissue and the megakaryocytes are normal, but the development of the white cells is arrested at the myeloblast level, and few myelocytes and polymorphonuclear cells are produced. The state of affairs is similar to the megaloblastic degeneration of the marrow in Addison's anaemia. Such a maturation arrest or anakmesis, as it has been called,[47] in which the marrow contains a normal or increased number of primitive or stem cells but maturation is inhibited, may affect the leucopoietic, megakaryocytic and erythropoietic tissues, either separately or together. In essential thrombocytopenia there is an increased number of megakaryocytes and megakaryoblasts in the marrow, although the number of platelets in the circulating blood is diminished,[48] and one may well suspect a similar state of affairs in sedormid purpura. In the anaemia of radium poisoning, more particularly the form due to the ingestion of radio-active material and internal irradiation of the marrow,[49] the marrow is extremely hyperplastic, as a result chiefly of arrest in development of the erythropoietic tissue and accumulation of immature erythroblasts. In most instances the dysplastic marrow of poisoning must be the result of a mixture in varying degree of degeneration, anakmesis, and aplasia. The variation in the degree of involvement of red corpuscles, leucocytes, and platelets in different toxicoses and the variety of the bone-marrow changes have given rise to great confusion in terminology. This applies particularly to the term agranulocytosis, which should be reserved for a lesion limited to the polymorphonuclear cells of the blood and characterized by arrest of maturation in the leucopoietic tissue. Constant additions to terminology are to be deprecated, and more use should be made of accurate descriptive names such as leucopenic leukaemia, arsphenamine purpura, benzol leucopenia, pure agranulocytosis, etc.

Neoplasia

The dysplastic bone-marrow is in an unstable condition. We have evidence that in agranulocytosis the maturation arrest of the leucocytes ultimately ends in aplasia of the leucopoietic tissue of the marrow. The long duration of some cases of aplastic anaemia is hard to reconcile with the complete disappearance of marrow cells seen at necropsy and suggests an intermediate phase of unproductive hyperplasia. This suspicion is strengthened by the fact that cases of benzol poisoning which present an identical blood picture in life may prove to have either a cellular or an aplastic marrow. A more difficult question is whether arrest of the normal development of the cells does not sometimes lead to the uncontrolled proliferation of leukaemia. The difficulty is that leukaemia is not an uncommon disease, and coincidence must therefore be excluded.

Rolleston concludes that the induction of leukaemia by *x* rays and radium has not been proved.[50] On the other hand Levent states that leukaemia is five times as common in physicians practising radiology as in their colleagues.[51] In experimental animals leukaemia has been induced by indole,[52] benzol,[53] and tar,[54] and there is therefore good reason for considering leukaemia in benzol workers[41 55] as more than a coincidence. In a remarkable case reported by Falconer, a patient under treatment for chronic benzol poisoning with an aplastic type of anaemia gradually developed the picture of lymphatic leukaemia.[56]

Aplasia

If the blood-forming organs are overwhelmed by a poison the stem cells die and the marrow becomes aplastic. Among substances capable of producing this degree of damage we may enumerate benzol and some of its derivatives such as arsenobenzol, dinitrophenol, and trinitrotoluene; mercury, silver, and gold; radium, and *x* rays. An injury so severe is unlikely to be confined to a single haemopoietic element, and usually red cells, white cells, and platelets are involved simultaneously. I have already mentioned, however, that in the late stages of agranulocytosis there may be a pure destruction of the leucopoietic tissue or granulo-phthisis. In other cases the destruction of the megakaryocytes is disproportionate (thrombophthisis or purpura maligna), though the severity of this condition depends as much on the torpor of the leucopoietic and erythropoietic tissues as on the intensity of the haemorrhagic state. As will be understood from what has already been said about the greater resistance of the red cells, the white cells and platelets are usually more severely affected, but this hardly justifies the introduction of the term aleukia haemorrhagica for cases in which white cells and platelets are predominantly involved. In conclusion I should like to stress my belief that the section of pathology with which I have been dealing is top-heavy with terminology and under-ballasted with facts. We need more histological data on the marrow not only from necropsies, but also from serial observations during life. We also need more clinical experiments, in which the effects of drugs to which patients appear sensitive are tested under controlled conditions. The interest of the subject should not be limited to haematologists, as it promises to throw light on the general problem of idosyncrasy.

Summary

1. The toxic effects on the blood-forming organs of drugs such as amiodopyrine, neoarsphenamine, and gold are usually the result of idiosyncrasy and occur with doses that are well within the ordinary therapeutic limits.

2. In certain cases the patient becomes sensitized to the drug and an allergic type of response occurs.

3. Considerable hardship may result from failure to realize the small dosage which may be responsible for damage to the bone-marrow in predisposed individuals, the long incubation period, and the protracted duration of the lesion.

4. The lesions produced in the marrow are briefly reviewed and classified under the headings of regenerative hyperplasia, dysplasia, neoplasia, and aplasia.

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J. C. Hughes, O. A. Dietheim, and A. H. Tebbutt (*Med. Journ. of Australia*, March 7th, p. 327), who report a fatal case of typhus in a man aged 44, state that the twenty-nine cases of typhus reported or notified in New South Wales during the last nine years were restricted to two widely separated areas—namely, the metropolitan area of Sydney and the far north-eastern area bordering on Queensland. In both these districts the disease appears to be on the increase. A similar distribution occurs in the south and west of Australia. A. H. Tebbutt and D. A. Warden (ibid., p. 330) report another case of typhus, the patient being a woman aged 55 living in a good house in a first-class residential district in Sydney. The symptoms were fever of fourteen days' duration, lethargy or drowsiness, slight prostration, but no splenic enlargement; the Weil-Felix reaction was positive on the eleventh day. Recovery took place.

PHYSICAL METHODS OF ENDOCRINOTHERAPY*

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One of the most important recent advances in the science of disease is the recognition and study of the metabolic endocrine disturbances which precede local organic conditions. It has been shown that the external morbid factors act first of all on the system integrating the body, a system constituted by the psycho-associational cortex, the vegetative nervous system, and the endocrines. Reactions on disturbances of this system precede and dominate local organic manifestations. Treatment of these disturbances, by helping this integrating system to re-establish its normal function, is the basis of modern internal medicine. The endocrines play an important part in this mechanism of biological integration. There are conditions in which the endocrine organs show predominant manifestations in what we rather artificially describe as "endocrine diseases." In all morbid conditions, however, we have to take into consideration the endocrine-metabolic disturbances, and their treatment is of the greatest importance.

Treating Endocrine Disturbances

Therapeutic action on the endocrine organs can be effected by various methods, first by endocrine organotherapy, using the glandular products themselves. In substitution organotherapy the glandular secretions in which the patient is deficient are given; this is the most potent procedure, although the indications for it are limited. Less effective is stimulating organotherapy, in which an endeavour is made to stimulate a deficient endocrine by giving glandular products. An endocrine can never be stimulated by its own product; an indirect route is therefore necessary, and the product of another endocrine which works on a superior level must be used, as when we stimulate ovarian function by the administration of pituitary.

Organotherapy, however, is not the whole of endocrinotherapy. We can affect the endocrines by other methods—by psychotherapy, by dietetics, and by certain drugs—but principally by physical methods. Biology gives us the basis of physical endocrinotherapy. The endocrines function according to external stimuli, the stimuli of physical environment. Physical medicine consists in a scientific study and utilization of these stimuli of our physical environment. The action of physical agents on endocrine function is effected through four distinct mechanisms, acting often in combination:

1. The ionic equilibrium mechanism.
2. The skin endocrinotropic mechanism.
3. The nervous reflex mechanism.
4. The direct glandular mechanism.

Ionic Equilibrium Mechanism

The ionic equilibrium mechanism re-establishes a normal ionic equilibrium through physical agents. As normal ionic equilibrium means normal permeability of the cellular membrane and normal reactivity of the cells, re-establishment of this equilibrium renders the cells more susceptible to hormonic influences. In many so-called endocrine disturbances there is a normal production of hormones, but, as the cells are not permeable to them, endocrine

* Read in opening a discussion in the Section of Physical Medicine at the Annual Meeting of the British Medical Association, Oxford, 1936.

disturbances occur. For normal permeability of the cellular membrane and for normal reactivity of the cells, calcium and potassium ions must exist in a certain definite proportion in the pericellular fluid. When this proportion deviates from the normal, hormones do not penetrate the membrane. Physical agents are active in re-establishing a normal ionic equilibrium, and thus help the action of the hormones. Arthur F. Hess and his collaborators, Lesné, des Gennes, Guillaumin, Rothmann, and Callenberg, have demonstrated an increase of blood calcium in hypocalcaemic conditions after ultra-violet irradiation. The ratio K:Ca is modified, potassium diminishing in relation to the calcium. This has been shown by Pincussen.

We often meet patients with distinct hypothyroidism, to give a frequent example, in whom even strong doses of thyroid have no effect. This is due to the fact that their hypothyroidism is not determined so much by insufficiency of thyroxine as by the fact that thyroxine does not act on the cells. If in the treatment of these patients ultra-violet irradiation is given their condition improves, because the ionic equilibrium of the pericellular fluid is re-established, and thus the thyroxine is able to act. What ultra-violet irradiation does other physical agents can do also. It is probable that the activity of certain oligometallic mineral waters arises from their action on mineral metabolism, especially on the ions of calcium and potassium.

Skin Endocrinotropic Mechanism

The next mechanism to be considered is that of stimulation of the endocrinotropic factors of the skin. Progress in physical medicine has confirmed the view that the skin is not an inert covering, but an endocrine organ functioning through the basal cells of the epidermis. That these cells possess a specific chemical action in regulating calcium metabolism has been shown by the transformation of ergosterol into vitamin D. Regarding the regulation of potassium metabolism and that of the other elements of mineral metabolism, this specific hormonic function has not been demonstrated, but we can accept the view that the action on calcium metabolism is determined by stimulation of the endocrine function of the skin. The skin probably possesses, besides its specific hormonic action on calcium metabolism, a systemic hormonic action comparable to that of the pituitary—that is, it produces certain factors (hormones?) which stimulate other endocrines. We can hold that there is production of a thyrotropic factor, of a gonadotropic factor, and probably of a parathyrotropic, adrenotropic, and pancreatic factor.

Nervous Reflex Mechanism

The third or nervous reflex mechanism represents the influence of physical agents on the nervous vegetative terminations of the skin. These terminations are extremely numerous. When they are influenced by physical agents they set up nervous vegetative reflexes through which the endocrine organs are influenced in their function. We find this mechanism acting in ultra-violet irradiation, in crenotherapy, and in climatotherapy.

Direct Glandular Mechanism

The last mechanism—the direct mechanism—consists in direct action of physical agents on the glandular elements of the endocrine organs. This is effected by certain penetrating radiations, the most important of which are Roentgen rays. Electro-magnetic radiations produced by the diathermy apparatus have a similar influence, as shown by the work of Dausset. The same can be said of the electro-magnetic radiations produced by galvanic faradic, and sinusoidal currents. Through such a local mechanism either stimulation or depression may be obtained.

Thyroid Stimulation

Stimulation of the thyroid function can be obtained by ultra-violet irradiation of the whole surface of the skin. Although clinical material is scanty, because the brilliant results of thyroid substitution therapy has made us neglect study of other therapeutic agents in this condition, certain definite facts emerge. Ultra-violet irradiation of the skin increases basal metabolism. Children with hypothyroidism are distinctly benefited by ultra-violet irradiation, and at the St. John Clinic I have been able to diminish certain excessive doses of thyroid with the help of this physical treatment.

Theoretically the first three of the described mechanisms can explain the beneficial action of ultra-violet irradiation in stimulating thyroid function. Practically two mechanisms enter into consideration—modification of the ionic equilibrium of the cells and stimulation of the thyrotropic factor of the incretion from the skin.

Depression of Abnormal Thyroid Function

X rays constitute the most powerful and distinct thyroid-depressing agents, their action being explicable by the direct glandular mechanism. Local ultra-violet irradiation gives in certain cases similar depressor results in hyperthyroidism (O. Bernhard, Langemak, Bach, Livet, Bennet Lemaire and Roger). Electro-magnetic radiation as given by means of the diathermy apparatus or the galvanic current can, in a certain dosage, lower the intensity of thyroid function. This is shown by the action of these agents in Graves's disease, investigated by Bordier in the case of diathermy and by Delherm in that of galvano-faradic current. The mechanism of action of these agents is the direct mechanism. They are not as efficacious, however, as *x* rays.

Certain forms of hydrotherapy have a soothing action on the thyroid function. Physicians of the Divonne-les-Bains hydro have noted these good effects in Graves's disease. High altitude climates have a soothing influence, which action of hydrotherapy, as of climatotherapy, can be explained by the nervous reflex mechanism.

Gonadal Stimulation

Stimulation of ovarian function is effected by general ultra-violet irradiation. The stimulation can be explained either by the mechanism of ionic equilibrium re-establishment or by the nervous reflex mechanism. It can be explained also by hypothesis of a gonadotropic incretion of the skin. Ultra-violet irradiation accelerates the onset of puberty. Thedering has seen in young girls thus treated rapid development of the breasts and pubic hair. This same irradiation acts beneficially in ovarian hypofunction with menstrual disturbances—oligomenorrhoea, amenorrhoea, irregular menstruation, dysmenorrhoea, and the menopausal syndrome; obesity of ovarian origin is also favourably influenced. Ovarian function can be stimulated also by diathermy, on the basis of the direct action of the diathermy electro-magnetic radiations (through heat or specifically) on the ovarian glandular elements, as shown by C. Robinson.

Depression of ovarian function can be obtained, as is well known, by means of *x* rays acting through the local mechanism.

Stimulation of the male gonadal function has been less marked. Amari and Saidman, however, have shown the good effect of ultra-violet therapy in infantilism in males due to gonadal deficiency.

Parathyroid Synergism

As physical agents ultra-violet rays act synergetically with the parathyroids. We find that distinct stimulation of the incretory functions of the skin results in the production of viosterol, which influences calcium metabolism, if not on the same level as the parathyroid hormone, at all events in parallel; this has been clinically demonstrated. The work of Arthur F. Hess, of Rothmann, and of Callenberg has shown re-establishment of normal calcium metabolism in conditions of hypocalcaemia; there is no need to give details of the brilliant results in rickets. Equally brilliant results are obtained in conditions of spasmophilia and tetany. I should here recall the fact that hypocalcaemia is the basis not only of spasmophilia, but of a great number of conditions of nervous excitability and irritability, particularly in children. The soothing of these states, by means of ultra-violet irradiation, is one of the most notable features of physical endocrinotherapy.

Depression of parathyroid function can be obtained by means of *x* rays.

Effect on Adrenals

Stimulation of adrenal function by physical agents is theoretically possible, but has not been absolutely demonstrated. There have been observations of asthenia of adrenal origin cured by ultra-violet irradiation, but on perusal of these observations I find no absolute proof of adrenal insufficiency. There is also some discrepancy in the work on ultra-violet action in Addisonian pigmentation and pigmentation of adrenal origin. I have remarked that patients with asthenia of hypo-adrenal origin, and, in general, patients of hypo-adrenal type, benefit greatly from the static electrical machine current, but on the whole I think that stimulation of adrenal function by means of physical agents is a matter for further study.

Depression of adrenal function by physical agents is obtained through *x* rays. This is demonstrated by the results of irradiation of the adrenals in hyperpiesia of adrenal origin and in certain cases of endarteritis obliterans. Rogoff has sounded a note of warning against such interventions, which can go too far.

Pituitary, Pancreas, and Thymus

Stimulation of pituitary function by physical agents has not been proved clinically. The views of Dausset, who endeavours to stimulate pituitary function by localized diathermy, are interesting but not conclusive. Depression of pituitary function can be obtained by *x* rays, hence the good effects of this procedure in hyperpituitarism, in Cushing's syndrome, and in pituitary headache.

Stimulation of insulin production is shown by the effects of ultra-violet irradiation in diabetes. These effects, however, are not constant. When obtained they can be explained on the basis of the nervous reflex mechanism. More distinct are the effects of high altitude climates in diabetes. The influence of certain spas in conditions of hyperglycaemia has a more complex mechanism. The action of alkaline mineral waters is effected more through hepatic than pancreatic routes.

Depression of thymus function can be obtained by *x* rays and by local ultra-violet irradiation (Gérard). It is explicable on the basis of the local mechanism.

Physical Agents and "Immunity Organs"

The "immunity organs" must be ranged among the endocrines, and thus belong to the integrating system of the body. Immune bodies are the products of internal secretion, and the function of immunity depends largely on that of the other endocrines. The skin itself from the endocrinological point of view is an "immunity organ." It produces immune bodies, and this production can be stimulated by physical agents. The pioneer work of Besredka on local immunity, of Bruno Bloch on esophyllaxy, and the systematic studies of Tzanck have demonstrated this fact. The study of syphilis affords many illustrations of this special function of the skin. It was remarked of old that syphilitics with intense skin manifestations—manifestations of the defensive reactivity of the skin—showed a milder development of their disease. Certain disturbing observations have been published (R. Bernard, Dujardin, Degneux) showing that syphilis treated after the occurrence of roseolae is more easily cured than that treated before the appearance of roseolae. There are observations showing the negativation of a Wassermann reaction resistant to intense anti-syphilitic treatment, through ultra-violet irradiation. Other observations show the reactivation of the Wassermann reaction through ultra-violet irradiation.

Physical agents, besides stimulating the specific immunity of the skin, can help by stimulating the endocrinotropic chemical factors of the skin and through a nervous route. Increase in the bactericidal properties of the blood after ultra-violet irradiation has been demonstrated by Eidinow. Increased immunity to tuberculosis after ultra-violet irradiation and high altitude climatotherapy has long been observed.

General Conclusions

Physical methods influence endocrine function, and the action of most physical methods can be explained by this mechanism.

This leads to a more general conclusion. There is a tendency among students of physical medicine to consider this branch of healing as a separate art. In my opinion it constitutes simply a development and an enrichment of internal medicine or of surgery, and can be separated from neither one nor the other. From the point of view of internal medicine we see that the mechanism of action of physical agents is similar to that of psychotherapy, dietetics, and pharmacotherapy. Thus the clinical application of physical agents follows the same lines as the other procedures of internal medicine, the law of diagnosis and the law of combination.

My object has been to systematize the factors pointing to the necessity of physical medicine thinking in terms of endocrinology, and of endocrinology thinking in terms of physical medicine.

G. Negiski and M. Omori (*Bull. Off. Internat. d'Hyg. Publique*, May, p. 847) record their observations on an epidemic in the department of Okayama, which lasted from April to October, 1933. The distribution was sporadic, though none of the three towns or of the nineteen districts in the department escaped, the incidence ranging from 2.05 to 2.83 per 10,000 inhabitants. The cases were numerous in the districts where traffic was active and the population dense. There was no great difference in the incidence in the two sexes. As regards age, forty-two patients were from 60 to 70 and thirty-six between 50 and 60; 67 per cent. were over 50. 124 (66.6 per cent.) patients died, eighty-eight of them in the first week and twenty-eight in the second. The highest fatality occurred on the third, fourth, and fifth days, the death rate being highest in persons of advanced age and in children under 5 years. The duration of the disease in the cases which recovered ranged from two to five weeks. The outbreak of 1933 was mild compared with previous epidemics. The principal symptoms were: (1) fatigue, anorexia, and a sensation of chilliness; (2) headache, gastric pain, and diarrhoea; (3) local symptoms such as impairment of vision, pain in the eyes, and a sensation of violent heat in the soles. The relative mildness of the symptoms of meningeal irritation and the frequency of contractures in the upper part of the thigh were the most characteristic features; in some cases paralysis developed.

TREATMENT OF HALLUX VALGUS AND RIGIDUS*

BY

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Hallux valgus is met with more frequently than any other deformity of the adult foot. It is seen very occasionally in infants or children as a congenital deformity, but in the vast majority of instances it results directly from the long-continued deforming pressure of badly constructed shoes. Consequently it is found most commonly in women on account of the height of the heel and the narrowness of the toe in the so-called "smart" shoes which they usually wear, and as a rule the full development of the deformity is not seen before adult life.

The primary alteration in the alignment of the foot consists in the adduction of the great toe towards the outer border of the foot. This of itself constitutes the essential deformity of hallux valgus, and the alterations of the muscles, ligaments, and bones which are so commonly associated with this primary deviation are secondary to it and result from the abnormal position of the displaced great toe. Thus the head of the first metatarsal becomes abducted from the second, increasing considerably the width of the anterior portion of the first intermetatarsal space. This abduction of the metatarsal from its fellows often appears to be the outstanding and basic deformity, and may in some cases be associated with the presence of a small wedge-shaped bone, the intermetatarseum, which lies at the base of the first metatarsal between this bone and the internal cuneiform, and from the *x*-ray appearance it may seem that the abduction of the metatarsal is directly due to the presence of this abnormal bone. Such, however, is not the case, as in many instances the *x*-ray of an apparently normal foot has shown the presence of such a bone without any abduction of the metatarsal. The abduction, in fact, results directly from pressure applied by the base of the displaced first phalanx of the great toe on the inner side of the articular surface of the head of the first metatarsal, and correction of this abduction follows on removal of this abnormal pressure. Such an improvement in the alignment of the bone can usually be seen within a few days of the removal of this pressure, except in those old-standing cases where the articular surface of the base of the metatarsal has become altered as the result of the development of osteo-arthritic changes.

A Vicious Muscular Circle

Because of the abduction of the first metatarsal the adductor obliquus and adductor transversus, which are attached to the inner side of the base of the first phalanx, are placed under increased tension, so that by their contraction the phalanx is pulled still further round to the inner side of the head of the metatarsal. The capsule on the inner aspect of the first metatarso-phalangeal joint becomes contracted, whilst that on the outer side of the joint is stretched, together with the abductor hallucis muscle, which is also attached on this aspect of the phalanx. The articular surface of the head of the first metatarsal becomes extensively altered in shape; its inner half, which is now the only portion to articulate with the base of the phalanx, retains its normal shiny appearance, while the cartilage covering the outer side and the apex of the articular surface, having lost its contact with the base of the phalanx, is fragmented, fibrillated, and irregularly pitted, and is not capable of acting as an articular surface, even though the phalanx were restored to its normal position. Osteophytic outgrowths also appear on the outer margin of the articular surface, and these may develop to such an extent that a definite exostosis is formed at this site. The articular surface of the base of the first phalanx also shows considerable alteration, the centre becoming depressed with a raised ring around the margin, so that the appearance of the base of the phalanx is very similar to that of the head of the radius. Over the outer aspect of the head of the first metatarsal increased pressure of the shoe, consequent on the displacement, results in the formation of a bunion, which may at times be the site of inflammation, or may even become the seat of a definite septic infection.

Owing to the displacement inwards of the great toe the direct distance between the point of origin and insertion of the extensor longus hallucis muscle is diminished; the tendon of this muscle is displaced inwards so that it lies in the first intermetatarsal space, and by its contraction acts as a strong deforming force. The flexor longus hallucis muscle cannot act in this way, as its tendon is firmly held in a rigid fibro-cartilaginous tunnel on the under surface of the head of the metatarsal and of the phalanx. The transverse metatarsal ligament, which connects the heads of the metatarsals, becomes stretched by the abduction of the first metatarsal, with the result that the support given by it to the transverse arch is lost, and the heads of the second, third, and fourth metatarsals fall and bear an increased proportion of the body weight in walking.

Further Deformities

Certain other changes occur more slowly, and are found only in cases where the deformity has been present for a long time. Thus the adducted toe, by its pressure, may lead to the development of a hammer-toe deformity of the second toe; or by its presence, either above or below the second toe, may result in flexion or contraction deformity of this digit, or may produce a displacement of the base of the first phalanx on to the dorsum of the head of the metatarsal. The third and fourth toes may also be similarly displaced or deformed, and almost invariably become the site of painful corns over the dorsum of the first interphalangeal joints or over the tips of the toes under the nails. These other deformities are usually the direct results of the adduction of the great toe, but after their full development correction of the causative deformity of the great toe does not necessarily lead to a correction of these secondary deformities, each of which may require treatment.

Treatment in Early Stages

In the early stages of the deformity, where the secondary contractions of the soft tissues and the alterations of the articular surfaces have not become permanent, correction is occasionally possible by moulding the toe and fixing it in the corrected position for a period sufficiently long to overcome the constant tendency to recurrence which is such a striking feature. In carrying out this line of treatment the toe is moulded by hand, combined if necessary with division of the contracted capsule on the inner side of the metatarso-phalangeal joint, followed by fixation in the corrected position for a period varying from two to six weeks. Such a correction of the alignment can, however, only bring about a restoration of shape and function in those cases where the displacement of the base of the phalanx to the inner side is slight, and where the articular surface of the head of the metatarsal is more or less normal. If such a procedure is

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carried out after the alterations of the articular surface the invariable result is a rapid reappearance of the deformity or the development of an arthritis which is so painful that the function of the joint is greatly impaired. Correction by moulding is of value only in the younger patient, in whom arthritic changes are uncommon, and its employment in the older type of patient is followed by failure in almost every instance. The correction may be maintained most efficiently by the application of a straight splint along the medial side of the toe, the splint being firmly bound to the arch of the foot and the toe being bound to the front part of the splint, so that its alignment with the first metatarsal is restored. After wearing such a corrective apparatus day and night for the first two months it may then be discarded during the day, being reapplied at night only. Toe stalls or wedges, placed between the great toe and the second, are frequently employed in the treatment of the deformity of hallux valgus. They may with advantage be used after some method of corrective treatment, but without such preliminary correction their usefulness is negligible. The pressure of the deformed great toe is always sufficiently great to lead to an increased pressure on the second, third, and fourth toes without producing any appreciable correction of the alignment of the great toe. As a result of their use the other toes become more crowded and deformed, and the presence of the toe-wedge leads only to an increased pressure on these other toes without having any compensating effect on the deformed great toe.

Operative Treatment

As a rule, even when first seen by the surgeon, the deformity of hallux valgus is so great that manipulative correction alone is insufficient to produce a cure. The changes in the articular surfaces of the first metatarsal have already appeared, the soft tissues have become contracted, and operative intervention remains the only possible method of correction. Many operations have been suggested, and most of them have been extensively tested. These various procedures may be placed under the following headings, according to the site of operation and the character of the tissue with which the surgeon is dealing.

1. Operation to shave off the prominences on the head of the metatarsal.
2. Operation on the neck of the metatarsal.
3. Operation on the head of the metatarsal.
4. Operation on the shaft of the metatarsal.
5. Operation on the base of the phalanx.

Shaving off Metatarsal Head Prominences

Shaving off the exostoses on the outer aspect of the head of the first metatarsal can at best result simply in an improvement in the appearance of the foot. The procedure does not in any way alter the relation of the base of the first phalanx to the head of the metatarsal ; the deformity of the great toe remains as before ; and if the operation be combined with manipulative correction of the alignment of the toe the result is the development of a painful inflammation, and possibly arthritis of the joint so long as the correction is maintained.

Metatarsal Neck Osteotomies

These operations, which consist in the removal of wedges from the neck of the metatarsal, have been performed through various incisions, some oblique, some curved, and some directly transverse. They result in a rotation of the articular surface of the head of the first metatarsal, but owing to the fact that they have not so definitely shortened the distance between the base of the first metatarsal and the tip of the terminal phalanx of the great toe the short oblique muscles of the foot are not so efficiently released from tension, and a recurrence of the deformity after this form of operation is unfortunately all too common.

Operation on the Head of the Metatarsal

This type of operation is probably used more commonly than any other in the treatment of hallux valgus, and although most surgeons employ some slight modification of technique they may all be classified under the general heading of "Mayo's operation," by which is meant the removal of the head of the metatarsal. After this the gap left by its removal is filled by the inturned bursa which was present over the medial aspect of the great-toe joint.

This operation has been carried out for many years, and with care and suitable after-treatment has given many excellent results. It has, however, the great disadvantage that it results in the removal of the anterior pillar of the internal arch and the inner pillar of the transverse arch of the foot. After removal of the head of the metatarsal both these arches are necessarily weakened, and unless suitable protection is provided subsequently the unsupported heads of the second, third, and fourth metatarsals fall to a lower level, with the probable development of pain under one or all of these fallen bones in walking. The operation results in a great improvement in the appearance of the foot with a considerable diminution in its width, and if the patient's status in life is such that no prolonged standing or carrying of heavy weights is necessary the result may be considered as being satisfactory.

In carrying out the operation the incision should be a straight one along the supero-internal border of the first metatarso-phalangeal joint. After being freed from its ligamentous attachments the head of the metatarsal is removed by cutting across the neck of the bone close behind its articular surface, and the bursa, which has previously been freed anteriorly but left attached to its posterior connexions, is then sutured in position between the raw surface of the metatarsal and the base of the phalanx.

By removal of the head of the metatarsal the distance between the base of the first metatarsal and the tip of the great toe is diminished. The tension on the oblique muscles of the foot which are inserted into the base of the phalanx is lessened, and the toe can be easily placed in alignment with the remaining part of the first metatarsal. Walking should not be permitted for at least four weeks after such a removal, and exercises to develop the muscles of the sole of the foot and massage of these muscles to improve the circulation are of the very greatest benefit in the after-treatment. The use of a suitable "insole," which supports the heads of the other metatarsals and prevents their complete collapse, is of the greatest help, and should be persisted in for at least twelve months.

Metatarsal Shaft Osteotomies

These operations, which are usually associated with the names of Hohmann and Ludloff, consist in an oblique osteotomy of the shaft of the first metatarsal. The operation is carried out through a long incision on the medial border of the foot. The metatarsal is now divided obliquely from above downwards and inwards, after which the great toe is forced into the correct alignment with the rest of the foot. As a result there is a definite shortening of the metatarsal, the two portions overriding and the posterior end of the anterior fragment adducting towards the second metatarsal, allowing the articular surface of the head of the metatarsal to be rotated so

that the portion of the articular surface which originally formed the inner side of the head and articulated with the base of the displaced phalanx now points straight forward, although it still bears the same relation to the phalangeal articulation.

Although this operation corrects the alignment of the toe, it has most of the disadvantages of removal of the head of the metatarsal. Owing to the shortening of the first metatarsal the normal support given by this bone to the inner side of the foot is lost; the heads of the second and third metatarsals project considerably beyond the first, with the result that abnormal pressure is placed on the two former bones and is frequently followed by the development of a painful metatarsalgia.

An attempt has been made by Hohmann to reduce this tendency to falling of the anterior arch by flexing the terminal fragment at the time of the correction of the alignment. This procedure results in a prominence of the head of the metatarsal on the sole, but does not affect the great problem of the shortening of the bone, with increased pressure on the other metatarsal heads.

Excision of Base of First Phalanx

The operation of removal of the base of the phalanx has many advantages over any of the other procedures. After this removal the deforming pressure exerted by the displaced great toe is obliterated, and correction of the alignment of the inner side of the foot is rendered possible. The abduction of the first metatarsal from the second immediately disappears unless a secondary arthritis is present at its base. In addition to this the whole correction has been carried out without weakening the strength of either arch of the foot.

The operation is carried out through a straight incision on the supero-internal border of the metatarso-phalangeal joint. After completely freeing the base of the phalanx from its ligamentous and muscular attachments, the bone is cut transversely about its middle and the whole of the proximal fragment removed in one piece. This removal of half of the phalanx constitutes one of the most important principles in the operation; if less bone is removed the result may be the development of a painful fibrous ankylosis—a tragedy which can be avoided by a sufficiently extensive removal of bone. If the deformity is of long standing and the extensor proprius hallucis tendon has been displaced and is acting as a deforming force it should be divided subcutaneously at some distance from the site of operation. If divided near the operative field the divided tendon may become involved in scar tissue and its action may be lost. If divided subcutaneously two or three inches above the site of operation union of the tendon will occur after six or eight weeks, with a complete restoration of its function.

After-treatment in this operation is comparatively simple; the abnormally mobile toe must be maintained in a fully abducted position until voluntary control of flexion and extension is restored. This object can easily be attained by placing a small wedge of wool between the great toe and the second until this voluntary muscular control of the toe has been re-established, when recurrence of the deformity is unlikely. Walking is permitted three weeks after the operation, and exercises and massage of the toe soon produce a diminution of thickening and an improvement in the circulation round the joint. The presence of a wedge of wool between the great toe and the second does not now involve the risk of increasing the pressure on the other toes as the adducting strength of the great toe is lost owing to removal of the base of its phalanx.

In carrying out any of these operations removal of any very prominent osteophytic outgrowths of the head of the metatarsal is of considerable advantage, raw surfaces being covered over by fascia, or fat from tissue in the operative field.

Hallux Rigidus

The deformity of hallux rigidus is met with either in adolescence or in late middle life. In adolescence the condition is usually found in association with a long foot which is narrower than normal, and examination of the great toe shows that the power of dorsiflexion is lost. Flexion is free, but movement above the horizontal line is restricted by an intense muscle spasm, both of the flexor longus hallucis of the toe and more especially of the short flexor muscles of the sole of the foot. *X*-ray photographs at this stage usually show no bony change, although there is often some thickening. Examination of the child's foot and the shoes usually worn indicates that the abnormally long foot has led to pressure on the end of the great toe, even though the shoe may be much too wide and does not grip the sides of the ankle. The reason is that the child is wearing a stock size in which the length of the shoe is out of proportion to its breadth in relation to the patient's foot. When these children wear shoes which are sufficiently long they are so wide that the heel and instep are completely loose. As a result a compromise between the correct length and the breadth of the shoe is given, and the child has to suffer continuous pressure between the tip of the great toe and the heel. There then follows inflammation of the great-toe joint, with irritation and secondary spasm of the muscles governing the inflamed joint.

Conservative Treatment

At this stage improvement can usually be obtained by the provision of shoes made to fit so that no pressure is exerted on the end of the great-toe joint. In addition, the wearing of a metal plate inside the normal sole of the shoe prevents dorsiflexion of the toe and diminishes the irritation, with a consequent gradual improvement in the condition. If this line of treatment is followed for at least two years the movements may be restored to normal and the development of secondary bone deformity prevented. In some cases operative intervention is unnecessary, as with relief from movements of the joint in walking and irritation from pressure on the end of the toe the inflammation lessens. Gentle massage of the toe-joint will lead to a gradual increase in the range of movement. Generally, however, treatment is not carried out sufficiently long, and eventually arthritis develops in the joint, leading to a clinical condition exactly similar to that of hallux rigidus occurring in the adult.

In adults the condition is accompanied by definite osteophytic outgrowths on the dorsum of the head of the metatarsal and on the base of the phalanx, while the capsule on the plantar aspect of the metatarso-phalangeal joint becomes contracted. Dorsiflexion of the toe is therefore prevented by a combination of protective muscle spasm, secondary soft tissue contraction, and the mechanical block of the bony outgrowth on the dorsal aspect of the joint. Under these circumstances, and if pain and discomfort are present in the joint, operative intervention is advisable.

Operative Treatment

The operations which may be carried out for the relief of hallux rigidus are almost identical with those for the relief of hallux valgus. When wedge osteotomies are used the wedge in this case is placed so that the base is directly upwards on the dorsum of the metatarsal, and the apex downwards just behind the articular surface of the head of the metatarsal. In this way, by removing

a considerable wedge of bone, the articular surface is altered so that a greater range of dorsiflexion is given without any alteration in the relation between the head of the metatarsal and the base of the phalanx.

The most satisfactory operation for the condition has been that of removal of the base of the phalanx. When this is carried out care should be taken to make certain that at least half of the phalanx is removed at the time of operation ; if less than this is taken the usual result is a painful fibrous ankylosis, and the patient may even complain of more pain than previously.

After-treatment is identical with that for hallux valgus ; walking is permitted after three weeks, and exercises and massage of the toe lead to an improvement in its range of movement. With a restoration of voluntary control of movement the disability is overcome.

PROBLEMS OF CHANCE IN CLINICAL WORK

BY

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A recent article on Bell's palsy in this *Journal*[1] recorded an attempt to find " a criterion whereby we may decide in the early stage [of the palsy] that a given case is unlikely to recover." The reason for the search was that facial nerve decompression should not be undertaken unless the odds against natural recovery were sufficiently high. Even a reader not specially interested in this question will easily recognize that this type of problem is extremely common, and the purpose of the present paper is to use the work on Bell's palsy simply as an example of ideas and methods applicable to many problems. In that work comparison was made between twenty-five cures and eighteen failures (Table I), and the

Table I.—*Data on Bell's Palsy (Tumarkin*[1]*)*

Cases	No Pain, No Loss of Taste	Pain, but No Loss of Taste	No Pain, but Loss of Taste	Pain and Loss of Taste
25 cures ...	18	4	2	1
18 failures	2	6	4	6

conclusion was that " if the patient has both pain and loss of taste the chances are 2 to 1 that he will not recover ; but if he has neither of these symptoms the chances are 25 to 1 that he will recover."

Neglect of Chance and of Sampling Errors

This work is a useful illustration of a general statement made two years ago in the editorial section of the *Canadian Medical Association Journal*[2]—namely, that in much medical literature there is inadequate recognition and treatment of questions of chance, of the allowance to be made for small samples, and of natural variation from sample to sample of the same material, whether that material is composed of blood specimens or cases of paralysis. This statement applies equally to all kinds of unpublished clinical and non-clinical discussions. It is, for example, not uncommon to hear an admission that a certain set of cases is two small to justify conclusions, but it is very uncommon to find any attempt to show what conclusions can be reasonably accepted from the given sample ; fairly often the speaker will, in spite of his admission, proceed to generalize and argue from his sample.

To avoid the hasty conclusion that these comments are those of an outsider, a statistical expert unacquainted with clinical problems, it is perhaps desirable to note the stages by which the present writer arrived at this point of view. A medical training in which no attention was paid to problems of chance and sampling errors was followed by research in embryology and histology in which these problems at once arose. The adequate teaching of anatomy entailed wide and continued acquaintance with clinical matters, and it soon became obvious that the same kind of problem was present everywhere.

Certain other things that became obvious may be summarized thus: (1) the term " statistics " is unfortunate because it suggests either masses of data, sometimes inaccurate, or highly artificial mathematical tests ; (2) the numerous books on the subject, including those on medical statistics, give too much and too complicated detail for clinical workers, and commonly fail to show that statistical ideas are of any use to a practitioner ; (3) the most important part, even of elaborate statistical technique, is the critical selection of material ; (4) for ordinary clinical work it is the ideas underlying the words " chance " and " sampling variation " that are of most importance, while the necessary technical tests are few and simple.

Everyone recognizes that diagnosis and prognosis are based to a very large extent on the weighing of probabilities, even if the physician or surgeon is not thinking in terms of exact numerical odds or chances. For many purposes it is unnecessary to go farther than this, but there are numerous other cases, such as the investigation of Bell's palsy, here discussed, where misleading conclusions are drawn unless the observer and reader of the article understand more clearly how to handle the tool that they are using—namely, the calculation of odds. It is not suggested that the clinical observer should apply elaborate mathematical analysis, but that he should examine more fully the ideas underlying his judgements —ideas that are fundamental in dealing with any living material.

Errors in Estimation of Chances

With regard to the conclusions drawn from Table I the first criticism concerns the numerical value of the chances. Out of twenty cases with no pain or loss of taste eighteen were cured and two were not cured. Therefore the chances of cure in such cases, so far as they can be estimated from this sample, are 18 out of 20—that is, the odds are 9 to 1 that such a patient will recover. Out of the seven cases with pain and loss of taste one was cured. Therefore the odds, so far as this sample shows, are 6 to 1 against cure.

The odds of 2 to 1, quoted above, seem to have been derived from a consideration of the eighteen failures, six of whom showed pain and loss of taste, and the only conclusion from this fact could be that, among the cases of failure, the odds were 12 to 6—that is, 2 to 1—against a patient who failed to be cured having shown both pain and loss of taste—a deduction that was not required. A similarly erroneous method seems to have been employed in assessing the odds of 25 to 1 in favour of cure when neither pain nor loss of taste is present.

Variation between Samples

It is true that the results of this investigation on facial palsy were put forward tentatively, but before even a tentative argument was based on them a second question should naturally have been asked—namely: how far is one justified in generalizing from these samples—that is, in applying the (corrected) odds, 9 to 1 and 6 to 1, to other patients?—one of the specified objects of the investigation. This question can be expressed otherwise by asking: what evidence is there from the sample of twenty patients (with paralysis but no pain or loss of taste) that, if all the thousands of patients in that class could be examined, the odds in favour of cure would not be 3 to 1 or 2 to 1, instead of 9 to 1 as suggested by the sample? The same kind of question can be asked regarding the sample of seven patients of whom only one was cured. The answer to such questions involves ideas of sampling that seem almost too elementary to mention, but which are often not properly considered before calculation is started.

First, a sample must be representative of its class. Theoretically the only proper way of obtaining such a sample is by random picking from the whole group, so that each individual is given an equal chance of appearing in the sample, but in practice this is seldom possible, and yet precautions have been taken to ensure that the given sample is equivalent to a random sample. The statistical expert may be acquainted with the kinds of errors that can detract from the randomness of the sample, but the clinical observer himself is in a much better position to know these. He must decide whether, in regard to factors that have or may have an influence on recovery from disease—for example, age, sex, severity of attack, and treatment—his sample can be considered as equivalent to a random sample of all the possible patients to whom he wishes to apply the odds estimated from his sample.

This consideration naturally leads one to look into the cases themselves for evidence of factors that may have great weight in the cure or failure to recover. It is obviously useless to find the chances of death from all cases of whooping-cough and apply the information to children under 1 year of age, in whom it is a very dangerous disease. Similarly, among cases of facial paralysis the question must be asked: have age, sex, mode of treatment, and so on, had any appreciable effect in the sample that I am investigating? The tests that may be applied to answer that question are beyond the scope of the present paper, and it will be assumed that, for the samples under consideration, all such detectable influences have been ruled out. Actually, if it were possible to determine the nature and degree of all factors promoting recovery or failure to recover, it would be possible to form a prognosis with the precision of an experiment in physics.

In medicine, prophecy in terms of chances or odds must be used, partly because many of these factors are unknown, and largely because, as in all biological phenomena, results are dependent on a large number of small factors, varying independently of each other from one patient to another. Recovery from disease depends partly on almost innumerable factors, such as the severity of the cause, the detailed anatomical arrangements of the affected parts—for example, vascularity, the vigour of tissue reactions, the history of the patient, constitutional factors, environment, including medical treatment, and many others. If this conception is followed into an apparently theoretical and somewhat mathematical discussion it will reveal the way in which one can answer such practical questions as those given above regarding the reliability of the odds estimated from a single sample.

At first the discussion can be confined to patients with a certain degree of severity of facial paralysis, denoted by or associated with pain and loss of taste. Let it be remembered that in these patients there are numerous small factors, independent of each other, promoting or retarding recovery. Even among patients who are placed in this class there must be some small differences in the degree of severity or extent of the lesion, perhaps differences that are not detectable by any available method. In some patients the factors for recovery will happen to predominate, in others the factors for failure. Let it be supposed that in a large series, say many millions of people, half recover—that is, the "true odds"* against (or for) recovery are even (1 to 1). If one now takes at random a number of samples with two patients, A and B, in each, then on the average half the A's will be cures and half will be failures. For each class of A, half the B's will be cures and half will be failures. Hence the general result will be:

Both cures: 25 per cent. of samples.
One cure; one failure: 50 per cent of samples.
Both failures: 25 per cent. of samples.

The same type of reasoning can be applied to samples containing any number of patients, but mathematical devices are employed to save labour. Thus it can be shown that, with samples of seven patients, if the odds against recovery are 1 to 1, the percentages in Table II should be expected.

TABLE II.—*Expected Samples if Odds For and Against Cure are Even (Seven Patients per Sample)*

Cures	Failures	Percentage Frequency	
7	0	0.78	6.25
6	1	5.47	
5	2	16.41	
4	3	27.34	
3	4	27.34	
2	5	16.41	
1	6	5.47	6.25
0	7	0.78	
Total ...	—	100.	

Reliability of Odds Estimated from Samples

With even chances or odds, the commonest samples are naturally those with four cures and three failures, and those with three cures and four failures—that is, they centre round the average value 3.5 cures (3.5 failures), and the original question with regard to the actual sample of seven patients can now be expressed in the form: what right has one to suppose that this sample does not belong to such a series, where the true odds are even (1 to 1)? Table II shows that samples that differ from the average value by as much as, or more than, the actual sample should be expected in 12.5 per cent. of the total (such samples being bracketed in the table). *Therefore, unless an observer is willing to risk being wrong in over 10 per cent. of his judgements in such cases, he should not claim that a sample of seven patients with six failures (or six cures) indicates odds other than 1 to 1.* Moreover, he should not be much surprised if another sample from the same type of patients showed six cures instead of six failures.

It is, of course, entirely open to any worker to set his standards of accuracy and safety where he chooses, but it is generally felt by workers in the field of chances and probability that an error of not more than 5 per cent. should be allowed in judgements of the type under discussion. On that basis there is no adequate proof that the given sample (six failures and one cure) does not come from a series with "true odds" of 1 to 1. This is expressed by saying that the sample has not shown any "significant difference" from a 1 to 1 ratio—that is, that the apparent difference has no proved meaning or significance beyond what would be expected by pure random sampling—the effects of chance alone. This can be expressed also by saying that there is no adequate proof that the true odds are "unlikely" to be 1 to 1.

Now if there were a sample with seven cures or one with seven failures it would be said to show a significant difference from a 1 to 1 ratio because such samples form only $2 \times 0.78 = 1.56$ per cent. of the whole series in Table II. Then one would be justified in saying that it was unlikely that the true odds were 1 to 1. The danger of accepting the actual sample of seven at its face value will be realized when it is pointed out that similar methods reveal that one is not justified in assuming that the true odds are unlikely to be 63 to 1 against cure, or 9 to 8 in favour of cure.

Attention can now be turned to the group of twenty patients with neither pain nor loss of taste. If there were many millions of such patients, and two-thirds of them were cured, the true odds in favour of cure would be 2 to 1. This could be interpreted as follows. The principal factor in determining cure was the lack of severity or extent of the initial disease or position of the lesion. In addition, however, there were, as always, numerous small independent factors contributing to cure

* For the sake of accuracy it should be pointed out that the term "true odds" is used in this article to signify the odds that would be approached more and more closely by taking larger and larger random samples of the same material.

or failure. In different patients these would be present to different degrees. If numerous samples of twenty patients were taken it can be shown, again with mathematical devices to lighten the labour, that there should be expected the various classes of samples in Table III.

TABLE III.—*Expected Samples if Odds in Favour of Cure are 2 to 1 (Twenty Patients per Sample)*
(Percentages below 0.01 are omitted.)

Cures	Failures	Percentage Frequency	
20	0	0.03	
19	1	0.30	1.76
18	2	1.43	
17	3	4.29	
16	4	9.11	
15	5	14.57	
14	6	18.21	
13	7	18.21	
12	8	14.80	
11	9	9.87	
10	10	5.43	
9	11	2.47	
8	12	0.92	
7	13	0.28	
6	14	0.07	1.28
5	15	0.01	
4 to 0	16 to 20	0.00	
Total ...	—	100.00	

With the criterion of significance used above, the actual sample (eighteen cures and two failures) shows a significant difference from the true odds 2 to 1, because Table III reveals that samples as rare as the actual sample, or more rare, form only (1.76 + 1.28 =) 3.04 per cent. of the total. This can be expressed by saying that it is unlikely that the given sample came from a series in which the true odds were 2 to 1. As a further illustration let it be supposed that the sample had contained nineteen cures. Samples as rare as this, or more so, form only (0.33 + 0.36 =) 0.69 per cent. of the total expected sets of samples in Table III. This is less than 1 per cent., and it can be stated that such a sample shows a "highly significant" difference from the odds 2 to 1—that is, that it is "highly unlikely" that such a sample came from a series with odds of 2 to 1.

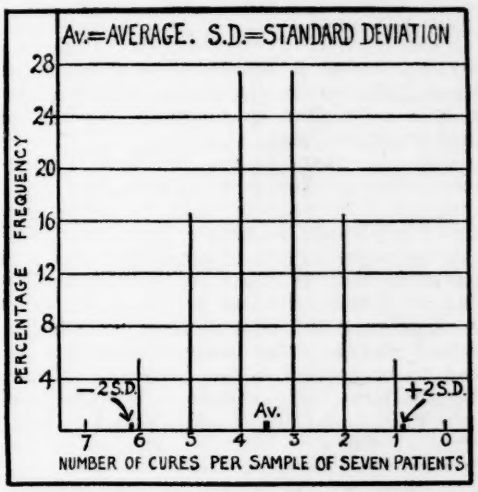
A Simple Method of Determining the Likelihood of Odds

If such elaborate methods were necessary before deciding how much reliance to place on a result, it would not be reasonable to suggest their use in clinical work, but the preceding ideas must be grasped to elucidate a very simple test that is for many purposes sufficiently accurate.

The accompanying graph shows the data from Table II —a symmetrical figure, rising to a peak which corresponds to an average of 3.5 failures to recover per sample of seven patients. A quantity called the standard deviation is calculated, and it can be proved mathematically that, when the numbers in the samples are high, twice the standard deviation, measured from the centre or average, will exclude, at the extreme left and right ends of the series, a total of roughly 5 per cent. of all samples, so that, on the criterion stated above, any sample beyond that distance can be considered as significantly different from the average. The validity of applying this to small samples will be discussed later, but in the meantime the method of using the standard deviation can be shown as follows.

In the given sample of seven patients six failed to recover. The question is: does this show that the odds against recovery are unlikely to be even (1 to 1)—that is, is this sample significantly different from an average of 3.5 failures per sample? If the odds are even—that is, the chances of failure are 1 out of 2, then the probability of failure, p, is expressed as 1/2. The probability of cure, q, is likewise 1/2. The number in the sample, n, is 7. The standard deviation is $\sqrt{npq}$—that is, $\sqrt{7 \times 1/2 \times 1/2} = 1/2\sqrt{7} = 1.32$. Twice this is 2.64. This quantity, added to the average (3.5) gives 6.14, and, subtracted from the average, leaves 0.86. Therefore, unless a given sample contains more than 6.14 failures or less than 0.86 failures, there is no adequate proof that the true odds are not 1 to 1, and the actual sample contained only six failures.

As a second example, the twenty patients without pain or loss of taste can be used. Eighteen recovered. Does



this show that the odds in favour of recovery are unlikely to be 2 to 1? If the odds were 2 to 1, p, the probability of cure, would be 2/3, and q, the probability of failure, would be 1/3. On the average, twenty patients would show two-thirds cured—that is, 2/3 of 20 = 13.33. Standard deviation = $\sqrt{npq} = \sqrt{20 \times 2/3 \times 1/3} = 2.11$. Twice the standard deviation = 4.22. The average *plus* twice the standard deviation = 13.33 + 4.22 = 17.55. The sample contained eighteen cures, and was further away from the average than this; therefore it is unlikely that the odds were as low as 2 to 1.

It may now be asked: is it "highly unlikely" that the odds were 2 to 1? For purposes such as the present this can be answered by taking three times the standard deviation—that is, 3 × 2.11 = 6.33. If this is added to the average, 13.33, the result, 19.66 cures, is farther away from the average than the number, 18, in the actual sample, and therefore there is no adequate proof that odds of 2 to 1 are highly unlikely. (To obtain a test for highly unlikely odds equivalent to the exact one given above, where 1 per cent. of samples was excluded, 2.576 times the standard deviation should be taken, but, besides its simplicity, multiplication by three gives a safer criterion.)

As stated at the outset, the standard deviation method is very accurate where the odds are even, giving a symmetrical series, as in the accompanying graph, and provided that the numbers of items—for example, patients—in a sample are large (one hundred or more). However, by use of exact probability tables,[3] from which the numbers in Tables II and III were taken, it has been possible to show that the standard deviation method is sufficiently accurate for the purposes now under discussion, with samples containing as few as three individuals, and with odds of 1 to 1; 2 to 1; 3 to 1; 13 to 3 (roughly 4 to 1); 7 to 1; 15 to 1; 63 to 1; and 255 to 1.

The examples given here have been limited to one disease, but it will be realized how the same methods can be applied to any comparable data. With any given sample it will be obvious how one can by trial find out odds that are unlikely because they are too high, and

odds that are unlikely because they are too low. (A more direct algebraic method is available, but is rather complicated.) The reader should beware of a method sometimes recommended—namely, to calculate a standard deviation from the sample itself and then set off twice this standard deviation on each side of the odds given by the sample, to mark the likely upper and lower limits of the true odds. This method is fairly safe when the odds are nearly even, but is not safe otherwise.

The Number of Cases

It is obvious that, in general, the greater the number of cases in the sample the more accurate will be the odds estimated from the sample, but the bane of statistics in the hands of those unacquainted with ideas of sampling is the trust placed in large numbers, although it does not require profound knowledge to realize that if, for example, one wishes to estimate the incidence of an infectious disease in a whole population, a perfectly random sample of a dozen people or less from the whole population is safer than a sample of several hundreds taken from the slums only.

Various specific questions may be raised regarding the size of samples. A worker who has seven patients of whom six failed to recover from paralysis may ask: how many cases should I observe to prove that the odds against recovery are 2 to 1, or are unlikely to be 2 to 1? The answer is that it can never be proved, without examining all possible patients, what are the exact odds. Even if all existing and past patients were included the result would only be an estimate of the odds when the result had to be applied to new patients. However, by increasing the size of the sample it is quite possible to narrow the margin of error to any desired extent.

Therefore a more specific answer can be given to such a problem as the following.

An observer has a small sample, and suspects that the true odds are 2 to 1. He knows that he cannot prove this, but, assuming that it is so, he wishes to know how large a sample he would require so as to be reasonably sure that the odds are not 1 to 1 or 3 to 1. The answer, obtained by calculation that is rather too elaborate for this paper, is that the observer could expect a sample of 130 to be large enough to show that the odds are unlikely to be 1 to 1, and that he could expect a sample of 450 to be large enough to show that the odds are unlikely to be 3 to 1.

With regard to small numbers the probability tables referred to previously show that, in terms of cure and failure, a sample of less than six patients cannot show that the odds for (or against) cure are unlikely to be 1 to 1, even if all the patients in the sample are cured or all fail to recover. A sample of eight is necessary before it is possible to show that odds of 1 to 1 are highly unlikely, and even then all the patients must be cures or failures before such a judgement is safe.

A Caution Regarding Methods

Although only one type of problem has been discussed in this paper it should be repeated that the idea of variation between samples is essential in all clinical work that involves counting or measuring, and a general caution regarding methods may not be out of place—a caution against the older statistical methods, still often used and often safe enough with large samples, but by no means safe where application to small samples is necessary, as is very common in clinical work. It is to the methods of Fisher,[4 5] his students and followers,[6] that one must turn for safety in such cases.

The calculation necessary in applying the standard deviation test is very small. If many extractions of square roots are to be done Barlow's tables[7] are to be recommended, but various smaller tables are often sufficient, and the direct arithmetical method is not very difficult. Finally, if a worker still hesitates to apply any tests to his results, he will, it is hoped, be prompted to observe the following rules:

1. To be sure that one's sample is the equivalent of a random sample of the material to be studied.

2. Never to express one's results as percentages without giving at least the totals from which *each* percentage was calculated.

3. Not to argue from samples unless they have been adequately tested by oneself or someone else. (An adequate test may, of course, entail only competent inspection of the data and results.)

Summary

In medical work there is serious neglect of highly important problems of chance and of variation between samples, exemplified in a recent estimate of chances of cure in facial paralysis where odds are wrongly estimated, and too great reliance is placed on samples.

What is required in clinical work is not elaborate mathematical tests, but an understanding of the meaning of chance, and adequate precautions that the samples, however small, are unbiased.

Recovery from disease, like most phenomena in life, commonly depends not only on a few important factors, but on numerous small independent factors, varying from patient to patient, and therefore, whatever may be the true odds for or against recovery, samples of patients must vary in the proportion of recoveries, and often give misleading ideas of the true odds. The simple standard deviation method, properly applied, is commonly adequate, even with a sample of three patients, to show what are likely to be the limits between which the true odds must lie.

The influence of sample-size is illustrated, and a caution is given against the use of old statistical methods that are specially unreliable with small samples.

I desire to acknowledge my indebtedness to Dr. R. A. Fisher, F.R.S., for inspecting this paper before it was offered for publication, and particularly for providing an alternative method of obtaining the numbers in the third paragraph of the section on the number of cases.

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THE VISSCHER-BOWMAN TEST FOR PREGNANCY

BY

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The introduction of a new method in the diagnosis of pregnancy, particularly of simple chemical tests which can be performed by any practitioner and will give an immediate result, is always of great interest. The disadvantages of the Aschheim-Zondek test and its modifications are that it requires a laboratory with a stock of animals, and the result is not available for at least forty-eight hours. In 1929 Voge[1] described a chemical test, the bromine test, which was simple, cheap, and rapid, but had 25 per cent. error among pregnant patients and 13 per cent. among non-pregnant patients.[2]

More recently Visscher and Bowman[3] have described another chemical test, for which they claim great accuracy. The test is performed as follows. To 1 c.cm. of urine are added one drop of 1 per cent. hydrogen peroxide, five drops of a 1 per cent. phenylhydrazine hydrochloride solution in water, five drops of a 5 per cent. methyl

cyanide solution in water, and five drops of concentrated hydrochloric acid. The mixture is heated in a water-bath for twenty-five minutes. After this time the reaction is said to be strongly positive if a russet colour develops with a thick flocculent precipitate. If a dark brown colour appears and there is a small, slightly flocculent precipitate the reaction is termed weakly positive. If the colour is brown and there is a slight powdery precipitate the reaction is regarded as suspect or negative. If the colour has not changed and there is no precipitate the result is negative.

Clinical Results

Visscher and Bowman investigated 317 cases and found a correct result in 294, or 93 per cent. approximately correct. They compared forty tests with the Aschheim-Zondek test and found that thirty-three gave the same result. The clinical result of only one of the seven cases where the two tests did not agree is given ; in this the chemical test was correct and the animal test wrong. Menken[4] investigated a small number of cases, four in the early months of pregnancy. In three of these in which the reaction was positive on at least one occasion, and negative on another occasion some time later, one of the pregnancies terminated in an abortion. The fourth case in this series gave a positive result, and an abortion occurred a few days later. Menken also investigated eight cases in the last month of pregnancy ; seven were positive. The negative one was from a patient who was delivered later of a healthy living child. He examined the urines of eleven non-pregnant patients, and found a negative reaction in all.

Dolff[5] investigated the urines of seventy-eight pregnant patients and found the test correct in 95.26 per cent. Of eleven cases of extrauterine pregnancy nine were correct and two wrong. He investigated a certain number of non-pregnant cases, and found the results negative in urines of low concentration, but frequently positive in urines of high concentration. He regards the test as a valuable one, and believes that if the reducing substances present in highly concentrated urine could be eliminated the percentage of correct results would be raised.

I have investigated the urines from 100 pregnant patients who were attending the ante-natal clinic at the Obstetric Hospital, University College Hospital, and found the result correct in 90 per cent. of cases. The ten pregnant patients from whom a negative reaction was obtained were between the twelfth and thirty-fifth weeks of pregnancy. I have also investigated the urine from eighty non-pregnant (gynaecological) patients, and found the test correct in 88.8 per cent. The nine patients in this group with a positive reaction have all been investigated clinically, and the absence of pregnancy confirmed. Four patients were past the menopause ; one of these had an ovarian cyst, two had fibroids, and one had a prolapse. The remaining five patients were of the child-bearing period. One had a carcinoma of the cervix, one had a retroversion of the uterus, two were suffering from dysmenorrhoea, and one had a prolapse.

Conclusion

It is clear that the percentage of error amongst the non-pregnant group is too high to make the test of any real value.

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Clinical Memoranda

A Case of Paradoxical Embolism

Cases of paradoxical embolism are of sufficient rarity to make the following one of interest. No case appears to have been recorded since 1930, when T. Thompson and W. Evans[1] described a number of cases and reviewed the literature on the subject. W. G. Barnard,[2] in the same year, added a further report on one case.

A married woman of 57 was operated on by Mr. A. G. Banks for acute appendicitis on March 11th, after twenty-four hours of abdominal pain. An acutely inflamed retro-caecal adherent appendix was removed. No drainage tube was inserted. Convalescence was uneventful except for a small stitch abscess, and the patient was discharged to the Bartlett Convalescent Home at Felixstowe on March 25th. Two days later, at 11 a.m., she suddenly developed severe pain in the right lower chest, and became very cyanosed and dyspnoeic. A pleural friction rub was heard at the right base. Next day, at 5.30 a.m., she developed a right hemiplegia and aphasia, and gradually sank into coma, which deepened until she died on April 8th.

Post-mortem Findings

A post-mortem examination was made by Dr. E. Biddle, pathologist to the East Suffolk and Ipswich Hospital ; the findings were as follows. The body was that of an obese female. Varicose veins were present in both legs. A recent operation wound in the right iliac fossa had healed satisfactorily. The brain was congested and showed slight flattening of the convolutions. On section in the left cerebral hemisphere beneath and slightly posterior to the Rolandic area was a soft, reddish, pultaceous mass about the size of a hen's egg. No other areas of infarction were found in the brain.

The air passages were clear, and the lungs well aerated and dry. No evidence of infarction or thrombosis was seen and the pleural surfaces showed no evidence of inflammation. The heart, about normal in size, showed no congenital or other defect, except for a patent foramen ovale. This opening, about one inch in diameter when lightly stretched, was partially closed by a crescentic valvular fold, leaving a circular aperture about the size of a lead pencil. In this orifice lay a thin cord of ante-mortem clot about 5 cm. long and 0.5 cm. in diameter. There were no vegetations on the healthy valves.

In the abdomen the caecum was adherent to the posterior abdominal wall, and the parietal peritoneum was injected in the region of the common iliac vein, but there was no evidence of any suppuration in or about the caecum. The common iliac vein had, however, a healthy wall, and the clot it contained was obviously post-mortem in origin. Both external iliac veins and the enlarged femoral veins were filled by tough, adherent ante-mortem clots. The spleen, liver, kidneys, pancreas, and other organs were normal, and no other areas of infarction were discovered. Sections of the various clots confirmed our opinion as to the time of their formation.

In view of the sudden and intense dyspnoea and cyanosis and the pleural friction rub we were surprised to find no evidence post mortem of pulmonary infarction or embolus. Thompson and Evans suggested that a rise of pressure in the right auricle following pulmonary embolism might be the cause of the passage of clot from the right auricle to the left auricle through a patent foramen ovale. It is difficult to see how this explanation could apply in this case.

References

[1] Thompson, T., and Evans, W.: *Quart. Journ. Med.*, 1930, xxiii, 135.
[2] Barnard, W. G.: Ibid., 1930, xxiii, 305.

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Reviews

AN ENCYCLOPAEDIA OF MEDICINE

Since the second edition of Allbutt's *System of Medicine* was published before the war there has been no collective exposition of British medicine until now. Sir Humphry Rolleston, who was associated with the late Sir Clifford Allbutt in that work, has been chosen as editor of the new *British Encyclopaedia of Medical Practice*, the first volume of which has just appeared,[1] and has with him as an advisory board Professors F. R. Fraser, G. Grey Turner, and James Young of the British Post-Graduate Medical School, with the help and support of Sir Leonard Rogers, who contributes a scholarly article on amoebiasis to this volume, in tropical medicine, and Dr. F. M. R. Walshe for neurology.

It is projected that the whole range of medical, surgical, and obstetrical practice, together with the special branches, should be covered in eight or nine volumes. The work deals with subjects in alphabetical order, with numerous cross-references, and the first volume includes those headings comprised between abdominal pain and appendicitis. Each subject is arranged, after a short introduction, with concentration on diagnosis and treatment. The first article, on abdominal pain, by Mr. John Morley, himself an original worker on the subject, is a model for other authors. Mr. Morley gives an excellent summary of present-day views on visceral and referred pain in the abdomen, and then proceeds to apply this knowledge to the diagnosis of the various abdominal catastrophes and emergencies. Of the longer surgical articles those of Mr. Lionel Colledge on the accessory sinuses of the nose, on amputations by Messrs. G. H. Colt and Philip Reading, on appendicitis by Sir David Wilkie, and on diseases of the anus by Mr. W. B. Gabriel are outstanding. Medical subjects include anaemia by Drs. John F. Wilkinson and L. E. H. Whitby, who give a complete exposition of present-day knowledge and future problems ; albuminuria by Dr. Izod Bennett ; anorexia nervosa, aerophagy, achlorhydria, and achalasia or absence of relaxation of sphincter control, by Dr. A. F. Hurst, who brings under one pathogeny the Plummer-Vinson syndrome with dysphagia, anaemia and glossitis, the so-called cardiospasm, spasm of the pyloric and anal sphincters, as well as absent relaxation of the sphincter of the cervix uteri in dysmenorrhoea and of the vesical sphincter as a cause of congenital dilatation and hypertrophy of the bladder ; and angina pectoris and coronary thrombosis by Dr. Evan Bedford, who is associated with Dr. Maurice Campbell in the article on aneurysm. Neurological subjects include apoplexy by Dr. E. A. Blake Pritchard and aphasia by Dr. Macdonald Critchley. The diseases of the adrenal are dealt with by Drs. Otto Leyton and Levy Simpson ; achondroplasia by Dr. L. G. Parsons ; and acromegaly by Sir Humphry Rolleston himself. Articles on ante-natal care by Dr. F. J. Browne, with an addendum on ante-natal care in the Tropics by Mr. V. B. Green-Armytage ; on amenorrhoea by Mr. Eardley Holland ; and on abortion by Mr. D. W. Roy are useful contributions to obstetrical problems. Mr. Roy's article deals with the causes and preventive treatment of natural and unintentional abortion, its clinical aspects and varieties ; and the section on the legal position of the practitioner in determining the medical grounds for abortion and his attitude and responsibilities towards illegal abortion is likely to be very helpful. Dr. G. H. Oriel's article on allergy is full and detailed, and Dr. Stanley G. Graham's on acidosis and alkalosis covers the ground well. The editors have chosen representative men in various branches of the profession, and the names of these authors are sufficient warrant of the value of their contributions. The practitioner will thus find in the encyclopaedia all that he wants to know about the subject in which he is interested.

Sir Humphry Rolleston, in his introductory remarks, points out that in the history of medicine there have been times of brilliant activity and advancement of knowledge separated by long intervals of comparative stagnation. More recently the numerous workers in the practical and scientific branches of medicine are producing such an amount of material that changes in stress on certain aspects of the subjects are bound to take place. During the early part of the present century the development of radiology and bacteriology has done much to alter the practice of medicine ; the surgery of the abdomen, the chest, and the nervous system has been brought up to a standard hitherto unattainable ; and the discovery of insulin and the introduction of liver therapy have profoundly changed the treatment and outlook in diabetes mellitus and Addisonian anaemia. This rapid accumulation of knowledge in the art and science of medicine greatly reduces the survival rate of textbooks and systems. The frequency with which important discoveries in diagnosis and treatment are made may render a work out of date almost at once. It is proposed, therefore, that the new encyclopaedia should be kept up to date by the issue of a supplementary volume. Each article of the original series has a reference number. The references in the supplementary volume will correspond, and these additional articles will sift the current literature and retain what is likely to be of more than passing value. If this supplementary volume is renewed from time to time, as is projected, the whole system will be kept up to date.

The volume is of convenient form, clear type, and with sufficient illustrations. The aim of making the encyclopaedia essentially practical has been fulfilled in this first volume, and the succeeding ones will be awaited with pleasurable anticipation.

[1] *The British Encyclopaedia of Medical Practice. Including Medicine, Surgery, Obstetrics, Gynaecology, and other Special Subjects.* Under the General Editorship of Sir Humphry Rolleston, Bt., G.C.V.O., K.C.B., M.D., D.Sc., D.C.L., LL.D. Vol. i. *Abdominal Pain to Appendicitis.* London: Butterworth and Co. (Publishers) Ltd. 1936. (Pp. 742 ; illustrated.)

"MUSCULAR EXERCISE"

In producing a book[2] on muscular exercise which can be understood by all Dr. Grace Eggleton has indeed done good service, for there is every indication that in the near future physical education will become increasingly popular. Also it cannot be too often emphasized that in physical exercise almost all the essential organs of the body are brought into action, and should periods of stress caused by disease occur the body which is efficient physically is all the more capable of withstanding them. This is particularly true of the haemo-respiratory system, on which special emphasis is laid in the book.

The volume, for the most part, is a simple statement of what occurs in the body when it is exercised. There are chapters on respiration, circulation, oxygen transfer, body acidity, body temperature, muscular contraction, and a final chapter on the athlete. If we say that the book is much the best that has been produced on the subject—and that can be fairly said—it must not be thought that it could not be improved upon. It lacks a little in balance. Some chapters are simple, but others, such as those dealing with the chemistry of muscle contraction and body acidity, will scarcely be appreciated by those for whom the other chapters were obviously written and by whom the glossary of words at the end is needed.

[2] *Muscular Exercise.* By M. Grace Eggleton, M.R.C.S., L.R.C.P., M.Sc. London: Kegan Paul and Co. Ltd. 1936 (Pp. 298 ; 68 figures. 10s. 6d. net.)

This is, however, possibly excusable in a book by one who has herself contributed so materially in this special field. It does seem, too, that more should have been made of the influence of psychical aspects of the problem. The mental desire and intensity associated with exercise is so well recognized as influencing the body economy and even the muscular efficiency that it should not have been almost entirely omitted.

There is undoubtedly a need for such a book, not only among teachers in schools but also among doctors generally, whose advice on such subjects is often sought. By both these it will be appreciated, for it provides them at once with information which can be relied upon and at the same time can be understood by the average educated reader.

PATHOLOGY OF THE NERVOUS SYSTEM

Pathologists were recently criticized for neglecting the most important system of the body, but Dr. BIGGART'S book on *Pathology of the Nervous System*[3] shows that all do not deserve this criticism. Its aim is to give the student a brief survey of the most important points in neuropathology, so that he may link the pathology of nervous tissues to that of other tissues in the body. But it goes beyond this in being a useful review of modern views on this important subject. Diseases are, so far as is possible, grouped on an aetiological basis, and if a large number have to be classed as "diseases of unknown aetiology" the mere chapter heading will be a stimulus to research. It might have been justifiable to include in this chapter all the diseases classed as degenerative, as the words "degeneration" and "abiotrophy" are merely cloaks for our ignorance of the causes of decay. Many of these degenerative diseases affect children and young subjects, and most are familial or hereditary, but we still do not know in some whether the fault is in the germ plasm or in the environment, and if in the germ plasm whether the seeds of decay lie in the nerve cells or the nerve or muscle fibres, or whether they depend on some fault of metabolism in the body as a whole.

The chapters on the pathology of cerebral and spinal tumours should be of special value, as, in spite of the author's statement that these tumours form 1 per cent. of all growths, it is becoming recognized that they are much more common than this. Indeed, recent post-mortem statistics show them to be the cause of death in more than 1 per cent. of all hospital cases. The nomenclature and classification adopted in these chapters is that recently suggested by Bailey and Cushing, with some minor modifications, and the descriptions and illustrations of the various kinds of tumour are clear and informative. Indeed, the illustrations throughout are excellent, and much more plentiful than would have been expected in a book at this price.

PATHOLOGY OF WATER EXCHANGE

Serous Inflammation: The Pathology of Permeability,[4] by Professor H. EPPINGER and Drs. H. KAUNITZ and H. POPPER of Vienna University, is a valuable monograph on various problems concerning the pathology of water exchange. A supplement by Drs. H. Mark and A. von Wacek deals with protein structure, and gives a clear summary of the facts known regarding the hydration of protein gels and the permeability of protein membranes, thereby providing a useful basis for the consideration of the causes of oedema and water loss.

The authors explain that the purpose of the book is to provide an explanation for the clinical manifestations of shock, based on experiment and on histological observations. The first chapters are concerned with the different types of shock produced by wounds, burns, peptone, etc. Two chapters deal with shock produced by food poisoning. The authors have isolated from bad meat a substance which they believe to be an allyl derivative. They describe the toxic symptoms produced by allylamine and allyl formate, and show that it produces changes in the circulation similar to those produced by peptone poisoning. They conclude that allyl formate is a specific capillary poison.

The experiments and observations recorded in the monograph lead the authors to the general conclusion that between the cells and the capillaries is a space filled with tissue fluids, which normally have a low colloid-osmotic pressure. Capillary injury causes a leakage of blood proteins into the tissue fluids, and consequently a series of deleterious changes, among which may be mentioned the interference with oxygen transport to the cells.

This brief summary indicates that the authors have made a serious attempt to solve some of the most obscure problems of the pathology of oedema of tissues, and have brought forward important new evidence regarding its initiation.

A CLINICAL MISCELLANY, VOL II

The book with this title[5] comprises twenty papers by nine members of the staff of the Mary Imogene Bassett Hospital at Cooperstown, New York, and it bears many signs of serious devotion to clinical medicine. In the preface Dr. G. M. Mackenzie says that the contributors would like to believe that they are moving, even though slowly, along the path of integration of correlated clinical and laboratory observation. He contributes three interesting papers. A man aged 50 years had, for nearly five years, leukaemia, with a predominantly basophilic myelaemia; in its course spontaneous fracture of one femur occurred and terminal myelosarcomatous growths appeared in the liver and lymphatic glands. Reference is made to the rarity of this form of leukaemia, eight previously recorded cases being quoted. In a thoughtful paper on idiopathic aplastic anaemia the same author points out that although there is a symptomatic kinship between this invariably fatal disease and agranulocytosis, the administration of pentnucleotide fails in aplastic anaemia. In his case the absence of germinal centres in all the lymphatic glands examined was correlated with the reduction in the absolute number of the lymphocytes. In a third paper, in collaboration with Dr. Pike, the results of 1,283 consecutive blood cultures in a rural hospital are analysed. Dr. Marjorie Murray has contributed three papers, and has had a hand in two others, one "A Six-year Experience with Acute Anterior Poliomyelitis in a Rural Community," which deals with forty-six cases, the other an account of three cases of congenital atresia of the intestines. Dr. Murray also records a case of apparent cure of mediastinal Hodgkin's disease and one of juvenile acrodynia. Other articles on children's diseases deal with intussusception, and with gall-stones and cholecystitis. There are also papers on primary carcinoma of the vulva and of the Fallopian tubes. A valuable and practical contribution is that by Dr. J. H. Powers, on the treatment of bedsores by the hypodermic injection of insulin and the local application of *p*-thiocresol.

[3] *Pathology of the Nervous System. A Student's Introduction.* By J. Henry Biggart, M.D. Edinburgh: E. and S. Livingstone. 1936. (Pp. 335; 204 figures. 15s. net.)

[4] *Die Seröse Entzundung eine Permeabilitäts-Pathologie.* By Dr. Hans Eppinger, Dr. Hans Kaunitz, and Dr. Hans Popper. Vienna: J. Springer. (Pp. 298; 124 figures. RM. 26.)

[5] *Clinical Miscellany.* Vol. ii: 1935. The Mary Imogene Bassett Hospital, Cooperstown, New York. Springfield, Illinois: Charles C. Thomas; London: Baillière, Tindall and Cox. 1936. (Pp. 218; 35 plates. 3 dollars, or 13s. 6d.)

TREATMENT OF FRACTURES

Magnuson's book,[6] which now appears in its second edition, gives a very complete and detailed account of the treatment of fractures by modern methods. A brief review of the general methods employed is followed by a careful description of particular fractures and dislocations, with very full and exact instructions as to the best methods by which each may be reduced and the correct position maintained. In every instance instructions are accompanied by outline sketches which give great clearness to the verbal account, while the more important procedures are illustrated by detailed drawings, some of which show a high level of artistic merit. As an example we may refer to the discussion on fractures of the femur and to the description of the author's modification of the Smith-Petersen operation.

Modern methods of traction, such as the Kirschner wire, are described, but perhaps the most attractive feature of the book, and that most generally useful, consists in the number of small details which can only be gathered from long and intimate experience, and which make all the difference to the result obtained. We have only one criticism: that no account is given of the modern method of active use of an injured limb, largely introduced by Böhler, which has really revolutionized the functional results obtained. We hope that in a further edition these methods will be included, but meanwhile we cannot imagine any description of fractures of more practical use to the house-surgeon and, indeed, to every surgeon who deals with this class of work.

Notes on Books

Stoeckel's *Gynäkologie* is well known in this country as a good textbook for the general practitioner who can read German and a valuable work of reference for the gynaecological specialist. Less than a year ago we noticed the publication of a fourth edition, fully revised. Hard upon its heels comes the fifth edition,[7] including some new matter on carcinoma of the uterus, diathermy in gynaecology, contraception, sterility, and sterilization.

The sixth edition of Professor Samson Wright's *Applied Physiology*[8] will be welcomed by teachers and students of physiology and clinical medicine. The advances which have been made in so many branches of this subject have called for considerable revision and the introduction of much new material. Nevertheless the size of the book is increased by only seventy pages, and there are an additional ninety or so illustrations. New work which is dealt with includes: all the recent research on the endocrines and hormones, the Berger rhythm, the action of acetylcholine, the histamine test of gastric function, and even the physiological problems of the stratosphere are dealt with. A most useful addition is a chart showing the molecular structure and relationships of the various members of the sterol group which are of physiological, pathological, and pharmacological importance. Thus the structures of the oestrin, corpus luteum, and testicular hormones are represented diagrammatically side by side with the carcinogenic methylcholanthrene, vitamin D, and the cholesterol group. Lavish use is made of illustrative and illuminating diagrams, and throughout the text the presentation of purely clinical material in italics has been maintained. We have no doubt that this new edition of a physiological classic will prove as popular and as useful as its predecessors.

[6] *Fractures.* By Paul B. Magnuson, M.D. Second edition, revised. Philadelphia and London: J. B. Lippincott Company. 1936. (Pp. 499; 317 figures. 25s. net.)

[7] *Lehrbuch der Gynäkologie.* By Professor Dr. W. Stoeckel. Fifth edition. Leipzig: Verlag von S. Hirzel. (Pp. 760; 465 figures, 66 coloured plates. M. 33; geb., M. 35.70.)

[8] *Applied Physiology.* By Samson Wright, M.D., F.R.C.P. Sixth edition. London: H. Milford, Oxford University Press. 1936. (Pp. 686; 282 figures. 20s. net.)

Van Borgunnien's astrologo-medical treatise[9] is a transliteration of Sloane MS. No. 3002, one of the very numerous medical manuscripts in the British Museum library which still require more careful examination than they have yet received. It has been well edited by Mr. W. L. Wardale, assistant in the department of German at St. Andrews University, and appears as the thirty-eighth St. Andrews University publication, and the Carnegie Trust for the Universities of Scotland has defrayed some of the cost. The manuscript was written about 1425–50, and was compiled by a certain Mester Albrecht van Borgunnien, and Borgunnien was possibly the fief of that name near Zonnebeke in Flanders. The language is a dialect typical of the Baltic colonial area, used perhaps at Rostock or Lübeck. The writer was certainly not a Scandinavian, says Mr. Wardale, and it is not a copy of a Latin original. Book one treats of herbs; book two is strictly gynaecological; book three deals with salves. This is followed by the astrological part, a brief urinoscopy, and articles on the four complexions; the dies nefasti; directions for letting blood; dietetic precepts; predictions about the newborn child; and prognostications from thunder. The little treatise was worth printing, but Mr. Wardale might as well have added a translation, for, although he adds a glossary, the language in which it is written makes it difficult to read. It has already attracted attention, and Mr. Wardale gives a bibliography of what has been written about it.

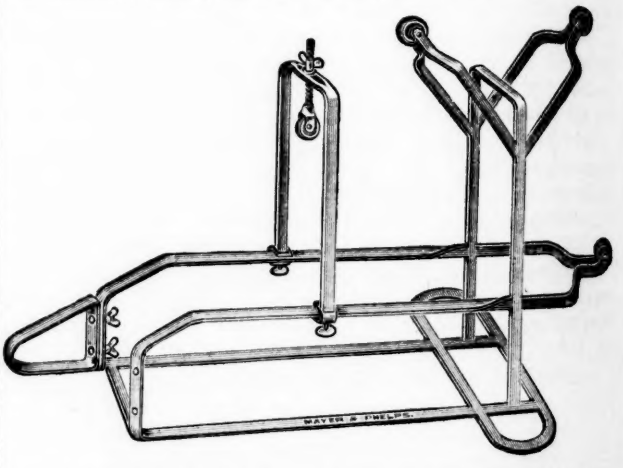
[9] *Albrecht Van Borgunnien's Treatise on Medicine (Sloane MS. 3002, British Museum).* By W. L. Wardale, M.A. St. Andrews University Publication, No. XXXVIII. London: H. Milford, Oxford University Press. 1936. (Pp. 80. 10s. 6d. net.)

Preparations and Appliances

A MODIFICATION OF BRAUN'S SPLINT

Mr. Cecil Flemming, M.Ch., F.R.C.S. (London, W.1), writes:

There are a number of cases of fracture of the leg in which a Braun's splint can be efficiently and conveniently used. More and more seem to be being used throughout the country. A minor modification which greatly increases the comfort of the patient may therefore be of general interest. For reasons of economy, these splints are usually made with side pieces of



equal length, so that the splint can be applied to either leg. Actually a splint of which the side pieces are equal and the proximal end square must be either inefficient or uncomfortable: for if the leg is pulled so far down into the splint that the upper third of the femur is properly supported, the inner side of the splint is impinging on the perineum. The comfort of the patient is increased if the inner side of the splint is shorter than the outer, as shown in the diagram. So that the splint can be used for either leg, the additional part of the side piece is detachable and is screwed on by two bolts. The highest supporting flannel sling is of course cut obliquely. An additional pulley wheel on the hoop which clips on to the side bars is sometimes useful. This also is shown in the diagram. I am indebted to Messrs. Mayer and Phelps for making these alterations for me.

A NATIONAL MEDICO-LEGAL INSTITUTE

REPORT OF ADVISORY COMMITTEE ON THE SCIENTIFIC INVESTIGATION OF CRIME

In April, 1935, the then Home Secretary, Sir John Gilmour, opened the laboratory for the scientific investigation of crime at the Metropolitan Police College, Hendon, and announced that he was appointing a committee of experts to advise him as to the manner in which this laboratory might best be developed in the national interest, "with especial regard to the desirability of its close and effective touch on the one hand with other police institutions established in this or other countries for the like and cognate purpose, and on the other hand with any medico-legal or scientific institute that may be constituted for teaching and research work in forensic medicine or other relevant sciences."

The original members of the Advisory Committee were Lord Trenchard (chairman), Lord Atkin (vice-chairman), Lord Dawson of Penn, Sir Russell Scott, Sir Edwin Deller, Sir Bernard Spilsbury, Sir Frank Smith, Sir Robert Robertson, and Mr. Hugh Lett ; to these were added later Sir Frederick Menzies and Sir Arthur MacNalty. In welcoming the appointment of the committee we expressed the hope that it would prove to have been the first step towards the speedy establishment of an Institute of Forensic Medicine worthy of the greatest city in the world.[1] The committee has now published an interim report,[2] which is almost wholly concerned with the general problem indicated in the second part of its terms of reference—namely, the establishment in the near future of a Medico-Legal Institute in the metropolis.

Teaching and Practice of Forensic Medicine

The report begins by noting that during the past fifteen months the Metropolitan Police Laboratory has become established, and is now an integral part of the machinery for the investigation of crime in London.

"The organization within the police service of a comprehensive laboratory system for the purpose of bringing the resources of science to bear upon the investigation of crime is, we are satisfied, a development of immense value, which should be pressed forward without delay. The development will, however, only solve one part of a larger problem, and to deal comprehensively with the subject it is necessary to go beyond the restricted field of purely police requirements. Our terms of reference require us to have regard to the desirability of the Metropolitan Police Laboratory being in close and effective touch, not only with other police institutions at home and abroad, but also with any medico-legal or scientific institute that may be constituted for work in forensic medicine or other relevant sciences, including teaching and research work. As regards the position abroad, it is common knowledge that the facilities available for the teaching and practice of forensic medicine are, in almost every Continental country, incomparably more complete than anything which we possess. The Rockefeller Foundation published in 1928 a comprehensive survey of the facilities then available for the teaching and practice of forensic medicine in different parts of the world, and no one who reads this survey can fail to be impressed by the comparison between the lavish scale upon which such facilities have been provided abroad and the exiguity of the provision made at home. The Universities of Edinburgh and Glasgow have their chairs of forensic medicine, but there was nothing in England which those who compiled the publication found worthy of note, and so far as London itself is concerned no facilities whatever exist for dealing in any comprehensive manner with the subject as a whole."

Inadequate Provision in England

Recognizing that the position in this country is, by common consent, most unsatisfactory, the committee has considered whether the needs of the situation can properly be met by the development of the Metropolitan Police Laboratory. The problem is not, however, confined to the restricted sphere of criminal investigation and police practice ; it extends, for instance, to such questions as the provision of proper facilities for the study of industrial disease and the manifold problems arising out of post-mortem work, and, most important of all, to the treatment in the academic sphere of medico-legal practice as a whole. These questions are obviously outside the range of any scheme based upon a purely police organization, and must be attacked from a much broader basis.

The inadequate provision in this country for the teaching and practice of forensic medicine "does not imply any reflection upon the academic authorities ; the position is simply that the medical curriculum is so crowded that the subject has of necessity been relegated to a position of obscurity in favour of more general teaching, which the average student would regard as being of greater importance to his career." It is, in the committee's opinion, a serious matter from the point of view of crime, and still more serious from the point of view of the development of this side of medical science, that special qualifications are not required as a necessary condition to the undertaking of medico-legal necropsies. It welcomes, therefore, the recommendation of the Committee on Coroners, which reported last January that coroners should normally be required to employ for post-mortem examinations pathologists whose names appear on a list to be kept by the Home Office, in collaboration with an advisory committee of medical men. It is also in entire agreement with that committee that if a Medico-Legal Institute were to be established as a training centre for medico-legal experts, and as a centre for pathological research, a diploma or degree or certificate from the institute might very properly become a qualification for appointment to the list.

"It follows from the absence of any sufficient incentive to the establishment of adequate teaching facilities that the provision for research is also seriously defective, and that facilities for the spread of new knowledge are starved."

Three Interrelated Functions of the Institute

Any scheme which is to meet the requirements of the situation must, the committee holds, provide ample facilities for three separate but interrelated branches of activity: (1) teaching ; (2) routine work ; (3) research. It is unanimously of the opinion that these requirements could best be met by the establishment in London of a National Medico-Legal Institute as a school of the University of London in the Faculty of Medicine.

The teaching functions of the institute would need to be planned on a comprehensive basis. Since the medical student cannot obtain the requisite knowledge and experience in the time at his disposal, the main functions of the institute in relation to medical training would be to provide a course of post-graduate study in forensic medicine, though the extent to which it could participate in the instruction of undergraduates should also be explored. The institute should also provide separate courses for students of law and for those such as police surgeons and coroners whose duties require, or would benefit by, some detailed knowledge of forensic medicine. On the other hand, the committee does not suggest that forensic medicine should be regarded as a specialized subject only to be taken by medical students or graduates who definitely intend to adopt a career for which it would be essential. Any medical practitioner may at any time be called upon to deal with an emergency in circumstances requiring a thorough and up-to-date knowledge of the principles and practice of forensic medicine.

The institute should be equipped to undertake a substantial amount of routine work of a medico-legal character. This should proceed side by side with—and, indeed, as an integral part of—its academic functions. It should have ample opportunities for the conduct of post-mortem examinations over a wide range.

"It is therefore essential that it should be equipped with a mortuary and ample facilities for the conduct of general post-mortem work, and we hope that in the course of time it will be possible to arrange for a substantial portion of the medico-legal post-mortem examinations in London to be carried out either at the institute itself or elsewhere by its staff. For these purposes it will also be necessary that it should be fully equipped with the necessary pathological, bacteriological, chemical, and physical laboratories, and staffed on a scale commensurate with the functions which it should undertake. It should also, of course, possess an adequate library, and should build up a museum of exhibits for the

[1] *British Medical Journal*, 1935, i, 833.
[2] Home Office: Report of the Advisory Committee on the Scientific Investigation of Crime, 1936. H.M. Stationery Office. (2d.)

use both of persons undergoing instruction and more generally for reference by outside workers in the medico-legal sphere."

An institute performing such functions would naturally become a centre for research in the medico-legal sphere, and the committee suggests that this work should not be entrusted only to the initiative of the staff, but that specific steps should be taken to encourage activities by making the institute a known centre to which problems of research would be referred by outside bodies. It should also co-operate with other institutions carrying out research in related subjects—for example, psychological medicine.

A Long Overdue Scheme

The committee, in conclusion, suggests that the scheme outlined in its report is long overdue, and should be pressed forward as a matter of public importance. While recognizing that a great deal of work must be done before the scheme can take final shape, it regards the case for proceeding with it as self-evident.

"It will obviously be necessary, in the first instance, to consult the authorities of the University of London, and public authorities such as the London County Council, both with regard to the principles involved in the proposals and, if these are agreed, the detailed arrangements for giving effect to them."

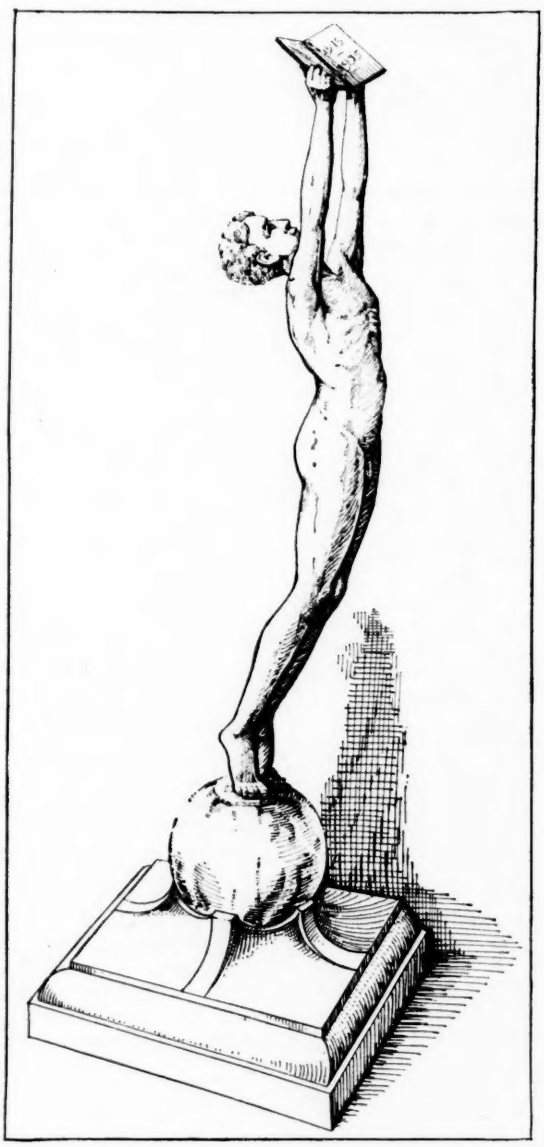
In the *Journal* of July 4th we were able to announce that the Senate of the University of London had lately given unqualified approval to the general principles of the scheme for creating in London a central institute of forensic medicine, and that it is hoped to associate with this a university chair. The unanimous recommendation of the Home Office Advisory Committee will, without doubt, expedite matters.

LORD MOYNIHAN: THE BRITISH JOURNAL OF SURGERY'S TRIBUTE

On July 11th (p. 90) we recorded a presentation to Lord Moynihan of Leeds by the Editorial Committee and subscribers to the *British Journal of Surgery* in appreciation of his distinguished services to that journal since its foundation and to surgical research. Sir Cuthbert Wallace, P.R.C.S., presided, and the presentation was made by Mr. Ernest W. Hey Groves, who has been Editorial Secretary from the beginning. The gift took the form of a silver statuette, a cheque for a thousand guineas to the Council of the Royal College of Surgeons of England for research work in surgery, and a commemorative tablet placed in the entrance hall of the College beneath Lord Moynihan's portrait.

The July number of the *British Journal of Surgery* is dedicated to Lord Moynihan. It opens with some "Ipsissima Verba" recorded by Sir D'Arcy Power, in which Mr. B. G. A. Moynihan described a successful operation for acute perforative appendicitis in 1895, when he was assistant surgeon to the General Infirmary at Leeds (*Lancet*, 1896, ii, 180). Professor Rutherford Morison follows with a personal appreciation of Lord Moynihan, whom he first met nearly fifty years ago before quitting Hartlepool to make his name in Newcastle.

An editorial note reminds us that it was in the years 1912–13 that the two projects, the Association of Surgeons and the *British Journal of Surgery*, began to take shape. The purpose of the Chirurgical Club was to bring provincial surgeons into closer association. This having been accomplished, it then remained to provide for a closer union between provincial and metropolitan surgeons and to found a journal representative and expressive of British surgery. Sir Rickman Godlee at that time was President of the Royal College of Surgeons of England, and in the drawing room of his house, before an audience of leading London surgeons, Moynihan first mooted his proposal for founding the Association of Surgeons. The war intervened, however, and it was not until 1919 that the association was founded, with Sir John Bland-Sutton as first president. Fortunately the *British Journal of Surgery* had already been planned and started, its first number appearing in April, 1913, with Moynihan as chairman of the Editorial Committee. During the difficult years 1914–19 it played a valuable part in recording the history of British surgery in the war. The wise guidance of Sir Berkeley Moynihan, then chairman of the consulting surgeons attached to the British Armies, helped to establish the new venture in a position of assured success. Later, during the six years of his presidency of the Royal College of Surgeons, he lost no opportunity of encouraging the promotion of surgical research, both at the laboratories of the College and, later, at the Buckston Browne Farm.



"The journal has been born, it has survived the dangers of infancy and adolescence, and grown to adult age during the more than twenty-one years that Moynihan has presided over its destinies. During that time he never missed a meeting of the Editorial Committee, and these meetings have always been as happy under his chairmanship as they have been fruitful of good results."

The chiselled silver statuette "Vigorous Youth," presented to Lord Moynihan on July 6th by Mr. Hey Groves on behalf of his colleagues, has been designed and made by Mr. Omar Ramsden. It shows a young man standing on a crystal globe and holding above his head an open book of gold bearing the words "The British Journal of Surgery, 1913–1935." The whole is mounted upon a base of carved rosewood. Our reproduction is from a sketch drawn for the *British Medical Journal* by Mr. Ramsden.

British Medical Journal

SATURDAY, AUGUST 1st, 1936

THE OXFORD MEETING

The ethos of an Annual Meeting depends to a large extent upon the place in which it is held, and of no place is this so true as of Oxford, with its great tradition and long list of learned alumni who through the centuries have enriched the culture of this country and provided it with leaders in Church and State and Medicine. Gothic and Renaissance architecture, the Bodleian Library, the spirit of the humanities, even, perhaps, memories of past strife between town and gown, cast their spell upon the visitor, which was reflected in the dignity of the proceedings and the quiet stateliness of the ceremonial occasions. While the charm of our oldest university lent an enchantment that could not fail to enrich such a memorable meeting, it would have been without avail but for the hard work and sustained effort of those who had rendered the machinery of organization invisible. No one could have been a more delightful host than Sir Farquhar Buzzard, the fourth Regius Professor of Medicine at Oxford to be President of the B.M.A. ; nor a more charming hostess than Lady Buzzard. Whether on the platform, or in the Sheldonian Theatre, or making an after-dinner speech, in grave or gay assembly, Sir Farquhar captured the minds and hearts of those who saw him by his unfailing courtesy and aptitude for the right word at the right moment. And all who heard his Presidential Address (printed in full in our issue of July 25th) will agree that few more right words have been spoken by a president at an Annual Meeting. Lack of space and not of gratitude makes it impossible to mention by name the numerous voluntary workers who put in so much time on the various committees, but tribute must be paid to the Local General Secretary, Dr. F. G. Hobson, who, ably supported by Dr. H. D. Woodroffe, with quiet and unhurried efficiency saw to it that event followed event in flawless order. As Science Secretary, Dr. A. M. Cooke, and as the energetic chairman of the Executive Committee, Dr. W. Stobie, played their part in as good a team as Oxford has ever produced. Nor must we forget those distinguished members of the lay public who were so ungrudging of their time and hospitality—Mr. A. D. Lindsay, Vice-Chancellor of the University ; Mrs. Townsend, the Mayor ; and Lord Nuffield. There is no need to remind readers of this *Journal* of the munificent gifts of Lord Nuffield to medicine: his name will live as one of its great benefactors, and the British Medical Association was happy in its choice of the Oxford meeting as the occasion on which to elect him an honorary member.

It becomes more difficult each year to sort out the impressions left by the Annual Meeting. The Association has grown so rapidly, even for a centenarian, and its influence and activities are extending in so many varied and important directions, that it is impossible to select from the medico-political and scientific deliberations at Oxford this topic or that as the crowning point of the meeting. The work of the committees that comes before the Representative Meeting inevitably tends to become more technical as the organization of the Association becomes more complex. And it was perhaps a sense of this complexity that accounted for the lack of controversy that distinguished this year's meeting of the Representative Body. The lay press, which afforded generous space to accounts of the meeting, gave full publicity to the resolution condemning the use of poison gas in warfare: the reality of the situation was presented by the Medical Secretary in his account of the negotiations between the B.M.A. and the authorities in organizing courses of instruction in anti-gas measures, and by the demonstration on July 22nd by the Oxford Branch of the British Red Cross Society of an air attack and an air-ambulance. Sir Henry Brackenbury showed once more his skill in debate in the emphatic and incisive way he discussed the problem of a national maternity service, and that Nestor of the Representative Body, Dr. C. O. Hawthorne, showed on more than one occasion that he had lost none of that verbal felicity which sways his listeners if it does not always persuade. In the chair, Mr. H. S. Souttar found his good-humoured smile a more effective, if more tardy, instrument than the gavel ; and when tongues became confused the Chairman of Council, Dr. E. Kaye Le Fleming, guided the discourse along more profitable channels of communication.

As was fitting, the Section meetings were an outstanding success. They were exceptionally well attended, and the high level of contribution and discussion was such that but little justice can be done to them in the limited space this *Journal* can afford to the summaries of proceedings that appear in this week's issue and will continue in the next two. The interest shown by the lay press in the discussion in the new Section of Nutrition, Sir Robert McCarrison's remarkable demonstrations in the Museum of Pathology, and the remarks on nutrition by Dr. R. R. Marett in his Popular Lecture, all go to show that medicine is taking a welcome and energetic lead in a matter which is also of profound significance to society at large. Indeed, throughout the meeting there was an insistence upon the part the doctor has to play in preserving and perfecting health , and the new knowledge on nutrition places in his hands an instrument of increasing precision in this respect, an instrument which he will be able to use effectively only when the community that wishes to be healthy ensures that all its members have available the right kind of food in the right quantity. It may not be fanciful to suggest that at Annual Meetings a hundred years from now many of the twenty Sections at Oxford will be included under the one Section of Nutrition. This year was distinguished, too, by the number of laboratory workers who gave up their valuable time to demonstrate recent work in this and that subject to their colleagues in practice.

Many must have left Oxford with the feeling that here at least medicine is not a lost cause. The traditions of Linacre and Harvey, and of the brilliant band of seventeenth century Oxford doctors, are being carried on in a way that bodes well for the future. With the new Nuffield Institute and under the wise guidance of a Regius Professor who realizes that *laissez-faire* individualism in medicine has its limitations, Oxford may become another island of Cos.

DRUG IDIOSYNCRASY

Laboratory research provides a sufficient safeguard against the use of immediately toxic doses of a new drug. Similar means explore the possibility of harm from cumulation of drug or summation of effect with repeated administration. It would seem impossible, however, to foresee and prevent disaster from idiosyncrasy. Professor L. J. Witts's paper on the effect of toxic substances on the blood-forming organs (printed at page 211 this week) reveals the grave risks which whole nations incur whenever a new drug is used extensively. He stresses very opportunely the distinction between undue susceptibility and personal idiosyncrasy. The susceptible individual merely requires a scale of dosage which is lower than the average one, but the idiosyncratic patient suddenly exhibits new and alarming reactions which could not have been predicted from previous experiences with the drug in animals or man. Sporadic blindness following the use of ethyl-hydrocupreine in pneumonia, acute yellow atrophy after cinchophen, malignant neutropenia after amidopyrine, and fatal purpura after dinitrocresol in obesity are some of the better known examples. Knowledge of the use of drugs has always been won by the method of trial and error. Those unknown pioneers or patients who first sampled white arsenic doubtless died in agony, sacrificed to later generations. Centuries of this kind of research have slowly furnished the data for our modern pharmacopoeias. In recent years the old dangers have become more and more intensified by the spectacular development of organic chemistry. Such a stream of new materials of possible utility in treatment has poured from the laboratories as might well have decimated the rash empiricists. Fortunately the technique of animal experimentation has undergone a parallel evolution.

Professor Witts is to be congratulated on a masterly survey of his branch of the subject and for reducing the terminological complexities of the haematologist to a simpler form. Shorn of these terrors the subject reduces itself to an inquiry into the idiosyncratic site of action of each drug, the relative extents to which the red cells, white cells, and platelets respectively are affected and the general nature of the damage sustained, which may be transient, permanent, progressive, partial, complete, or selective for some particular phase of maturation. The conception of an inhibition limited to the later phases only of cell development is of far-reaching interest. In the bone marrow it leads to crowding of the local tissues with forms which have developed unhindered up to a certain stage but have failed to mature, while the blood stream becomes deficient in the corresponding essential elements. This is the state of affairs in pseudo-aplastic anaemia. By tentative analogy the idea could be extended to other important fields, such as the possible effect on the subsequent embryo of the ineffective use of contraceptives.

It is sometimes suggested that the dangers of idiosyncrasy can be avoided by the use of small initial doses and careful graduation later. The course which events usually follow shows that such hopes are insecurely founded. As a rule the idiosyncratic reaction develops explosively after quite a small total intake of drug. Another unfortunate feature is that the bone-marrow lesion continues to increase after the withdrawal of the drug. Indeed, the first clinical manifestation may not arise until a clear interval after the last exposure to the drug.

The tale of disaster unfolded and the sinister potentialities which can be sensed in the products of chemical research give ample cause for evil foreboding. Experience is already sufficient to justify further precautionary measures. The right of each medical man to prescribe anything which he deems advantageous to his patient is one that must not lightly be set aside. The time cannot be far distant, however, when legislation will limit the sale of substances for internal use more strictly than in the past, and this will inevitably curtail the privileges of medical prescription. It would seem reasonable to insist that no new substance be offered to or prescribed for the public as a medicinal substance until it has been tested thoroughly for toxicity, cumulation of drug, cumulation of main effect or of undesirable side actions, and for common animal idiosyncrasy in accordance with some strict and discriminating procedure laid down by a competent official authority. The sale of new drugs which fail to pass the tests should be prohibited. Drugs eventually exhibiting after wider use a tendency to provoke serious idiosyncratic reaction could be withdrawn if it were judged that the advantages secured by the drug were insufficient to compensate for the catastrophes associated with its use. It is difficult to see why the prescription of drugs like amidopyrine and cinchophen should be permitted for another moment in the face of the numerous fatalities on record. The relief of minor pain afforded by amidopyrine is a poor exchange for the malign symptoms of agranulocytosis. The doubtful benefits of the increased urate elimination of cinchophen therapy are no adequate recompense for necrosis of the liver. On the other hand, the saving of life and health effected by quinine is of vastly greater importance to malaria-ridden communities than the evils which it precipitates through idiosyncrasy, and the benefits conferred by neoarsphenamine completely outweigh the calamities occasionally following its injection.

A still stricter view can be taken of the situation, and it might seem to be in the best interests of the nation that the sale of any new drug should be prohibited unless it could be shown to possess some substantial

therapeutic advantage over those already in service. The justice of subjecting a whole community to the risk of idiosyncrasy during the exploitation of a new drug which merely copies or slightly modifies the action of an earlier one is at least debatable. In the absence of Government action these are matters which must continue to be referred to the conscience and scruples of the individual practitioner.

MEDICO-LEGAL SCIENCE

At page 229 we give a summary of an interim report to the Home Secretary by the Advisory Committee on the Scientific Investigation of Crime. This committee was appointed in April, 1935 ; it is small in number, strong in personnel, and unanimous in its present recommendation for the establishment in the near future of a National Medico-Legal Institute. The terms of reference required consideration to be given to the desirability of linking the new Metropolitan Police College laboratory, on the one hand with corresponding police institutions in this and other countries, and on the other with " any medico-legal or scientific institute that may be constituted for teaching and research work in forensic medicine or other relevant sciences." After a brief survey of the exiguous provision made in England for the teaching and practice of legal medicine, the committee outlines a scheme for meeting the requirements of the situation, the first of these being that ample facilities must be provided for three separate but interrelated branches of activity—teaching, routine work, and research. It is unanimously of the opinion that these requirements could best be met by the establishment in the metropolis of a National Medico-Legal Institute as a school of the University of London in the Faculty of Medicine. The teaching functions, it says, would need to be planned on a comprehensive basis, and the institute should be equipped to undertake a substantial amount of routine work of a medico-legal character, proceeding side by side with its academic functions. An institute of the kind sketched in this report would naturally, and as a matter of course, become a centre for research in the medico-legal sphere, to which problems would be referred by outside bodies. Our hope that the principles laid down by the Advisory Committee will be put into effect without delay is supported by the knowledge that approval has lately been given by the Senate of the University of London to the idea of creating in this city a central institute for forensic medicine in association with a university chair.

MANIPULATIVE SURGERY

We publish at page 254 an account of the demonstration of his manipulative methods given last week by Sir Herbert Barker in the massage department of St. Thomas's Hospital at the invitation of the British Orthopaedic Association. The gathering was a large one, for besides members of the Orthopaedic Association a number of other surgeons attended, prominent among whom were Lord Moynihan, as well as the present and past occupants of the chairs of surgery in several of our universities. The demonstrator (who was unfortunately suffering from a bad cold) explained, and those present were able to perceive, that manipulative surgery is hard work, and that some of its manœuvres tend to be exhausting, particularly those applied to the sacro-iliac joints. Vigorous manipulations of the spine and sacro-iliac joints in cases of lumbo-sacral pain and low lumbar backache were performed without any anaesthetic, but most of the manipulations of the upper and lower limbs were done under gas and oxygen anaesthesia. The patients were allowed to recover from the nitrous oxide in the amphitheatre, and it was remarkable that most of them expressed themselves as being either free from pain or at least with less pain, despite the forcible manipulations that had been practised in some instances. The proof of the pudding, however, continues to be in the eating: these cases are to be followed up, and both the immediate and the late results will no doubt be commented upon by the members of the Orthopaedic Association at a future meeting The quiet confidence which the demonstrator obviously had in his methods and with which he presented these to his large audience was noticeable. The onlooker felt that congratulations were due both to him and to the Orthopaedic Association for a meeting such as this, whereby methods, orthodox or unorthodox, could be demonstrated to members of the profession with the worthy object of making known those that might prove of benefit to the afflicted. On the following day, in the Section of Orthopaedics at the Oxford meeting of the British Medical Association, Mr. Blundell Bankart opened a discussion on the uses and abuses of manipulative surgery, of which we hope to print a report next week, following this in a later issue with the full text of Mr. Bankart's paper.

ANTI-NARCOTIC ACTIVITY IN EGYPT

Russell Pasha, the energetic Director of the Egyptian Narcotics Bureau, in his report for 1935[1] records the relentless pursuit of drug traffickers, and claims that among the fellahin addiction is now almost negligible and that its chief prevalence is among the moneyed classes in the large cities. Anxiety is expressed as to the effect of release from prison of time-expired traffickers or addicts who have been imprisoned since 1925. These people, according to Russell Pasha, have been " made into criminals by the import into their country from abroad, by foreign traffickers, of tons of profit-making poisons that threatened to destroy body and soul." Analysis of the cases of 400 prisoner addicts showed that opium, heroin, and hashish were the drugs most frequently resorted to, and in the order of priority in which they are named. Details of some eighteen seizures of narcotics are reported, in many cases involving groups or gangs of traffickers and disclosing most ingenious methods of concealing the contraband drugs. The most sensational exposure of the year was that known as " the doctors' case." Eight physicians, two male nurses, one chemist, and one fellah were arraigned before the Narcotic Court in Cairo on June 2nd, 1935. The charges against them were (1) of providing facilities to drug addicts for illegally procuring narcotic drugs ; (2) of being in illicit possession of such drugs ; and (3) of failing to keep a proper narcotics register. Seven of the physicians and the two male nurses were found guilty

[1] Report for 1935. Central Narcotics Intelligence Bureau. Bulâq. Cairo: Government Press.

on one or more of the charges and were sentenced to one year's imprisonment with hard labour, together with a fine of 200 Egyptian pounds. Four of the physicians were suspended by the High Medical Council for one year and one for six months to follow on their sentences of imprisonment. Comment was made by the judge at the trial upon the absence of any institutions or sanatoria to which drug addicts might be sent for treatment and cure. Russell Pasha has again urged the Government to send a mission to the United States to study treatments and decide what is most suitable for Egypt. He also advocates legislation to enable authorities to detain voluntary patients even against their will until the completion of the treatment.

MALARIAL THERAPY FOR G.P.I.

The Mental Hospitals Committee of the London County Council has submitted to the Council a preliminary report on the results of the treatment of general paralysis of the insane by malarial therapy which contains some valuable statistical information. The fuller publication which is to follow in a few months' time will probably deal also with the results of artificial pyrexia by sulfosin and other methods, but this interim report confines itself to the malarial treatment. In 1924 a malaria laboratory was established by the Ministry of Health at Horton Mental Hospital—one of several L.C.C. hospitals close to Epsom ; and the treatment of female general paralysis has been for some years concentrated at Horton, though male cases continue to be admitted to other L.C.C. mental hospitals. It appears that the clinical types of G.P.I. cases have remained fairly constant during the last quarter of a century. Before the introduction of malaria treatment in 1923 there was no real recovery from general paralysis: half the cases were fatal within a year of admission, and three-quarters within two years ; practically all patients died within five or six years, and practically none recovered their health. In recent years there is a very striking—almost a sensational—improvement shown in the statistics. The proportion of deaths is reduced to about 30 per cent. Twenty-five per cent. recover sufficiently to leave hospital ; in the majority of these cases this recovery is permanent, and many of the patients are able to return to employment and maintain themselves. Even those whose recovery does not progress so far that they can leave the care of a mental hospital are often so much improved that they are far less of a nuisance to themselves and a burden to their attendants than was formerly the case. The report further draws attention to a notable drop in the admission rate of new cases. Before the war the average number admitted per annum during a six-year period was 323 ; for the six years 1930–35 the average was 241. The Board of Control's figures show that the rest of England and Wales is experiencing the same fall in the number of new cases as has occurred in London. It is suggested that a factor in this decrease is the earlier diagnosis due to modern methods, resulting in a proportion of cases being treated and cured in general hospitals and in institutions for uncertified cases such as the Maudsley Hospital. This is probably quite true, but the drop is so substantial that there may be other factors at work: it seems at least possible that the modern intensive treatment of syphilis is resulting in fewer cases of parasyphilis ; and it is to be hoped that when the final analysis of the L.C.C. statistics is submitted by the officers of the Mental Hospitals Committee there may be some attempt to evaluate this factor. The preliminary report of that committee was submitted to the L.C.C. this week in compliance with a motion proposed last February by Dr. Henry Robinson and seconded by Dr. Florence Barrie Lambert.

SICKNESS ABSENCE AND LABOUR WASTAGE

In the first part of Report No. 75 of the Industrial Health Research Board[1] the subject of absenteeism from sickness among workers engaged in light factory occupations, clerical work, and salesmanship is described in detail by Dr. May Smith and Miss M. A. Leiper. The data discussed were obtained at thirty organizations, each comprising many hundreds or thousands of workers, and covering two to seven years, but in spite of the bulk of their material the investigators insist that the generalizations arrived at by them are only tentative, and may be much modified in the light of more complete investigations. They point out that in order to unravel satisfactorily the complicated web of the causes of sickness absence it is necessary not only to analyse the sickness data continuously for a period of ten years or so, but to obtain detailed knowledge of the material and psychological conditions of the work performed, the methods of selection of the workers, their supervision and chances of promotion, and labour wastage. The sickness rate is a final expression in arithmetical form of the resultant of all the conditions acting upon the individuals. In spite of this searching self-criticism, the main conclusions arrived at by the investigators are well worth study. They found that sickness absence is usually higher for women than for men, the two largest groups of workers tested showing an absence of rather less than four days a year in men and rather over five days in women. Factory workers usually had a lower rate than the clerical workers in the same organization, while the shop assistants had the highest rate of all, perhaps because of the more exacting nature of their work. The lowest sickness rates were observed at organizations where the selection of employees was good, where there were adequate chances of promotion for efficient workers, and where the medical staff had a thorough understanding of the nature of their work. The greatest cause of absence in every group investigated came under the two headings " colds " and " influenza " (which had to be grouped together owing to uncertainty of diagnosis). Between them they accounted for 30 to 40 per cent. of the total sickness loss. Accidents generally came next in importance, especially in men, followed by gastric conditions and nervous conditions. In the second part of the report Professor M. Greenwood and Dr. May Smith discuss the estimation of labour wastage. They point out that the determinations of labour wastage hitherto made have not been very satisfactory, and they seek to remedy this state of things by describing in detail

[1] Medical Research Council. Industrial Health Research Board. Report No. 75. Sickness Absence and Labour Wastage. Part I, by May Smith and Margaret A. Leiper (with the co-operation of Millais Culpin). Part II, by Major Greenwood and May Smith. London: H.M. Stationery Office. 1936. (1s. 3d. net.)

a suitable arithmetical analysis. Their scheme is based on the methods used in the analysis of vital statistics, for they maintain that *every* method in use for the measurement of death rates has its application to the measurement of labour wastage. There is a very close analogy between the two ; so far as any particular establishment is concerned a worker who has left has died, and a new worker who is taken on is born. The authors illustrate their scheme by an analysis of wastage data collected at two organizations.

ACUTE ASEPTIC MENINGITIS

From time to time cases are seen which present the clinical picture of a severe meningitis. On lumbar puncture the cerebro-spinal fluid shows an increase in protein, a large number of cells, mostly lymphocytes, but no diminution in chlorides, and examination of films and cultures for organisms is negative. Up till 1925 these cases were almost certainly mistaken for tuberculous meningitis in which the tubercle bacillus could not be demonstrated, and they probably represented reported cases of recovery from that disease. In that year Walgren described the syndrome as a clinical entity, and stressed the importance of its differentiation from tuberculous meningitis as the prognosis in the one condition is as good as it is hopeless in the other. Since then a number of cases of this nature have been recorded under the names of "acute aseptic meningitis" (Riesman),[1] "acute benign lymphocytic meningitis" (McLean,[2] Collis[3]) and, to add to the confusion, "serous meningitis," which denotes a condition with a known aetiology familiar to otologists. Bürgers[4] has remarked that in Germany cases of meningitis are becoming more common, and that a larger percentage of these have sterile cerebro-spinal fluids. His experiments on the injection of cerebro-spinal fluids into animals have been unproductive, but evidence has been brought forward both in this country and in America in support of a virus aetiology for at least some of these cases. During the transmission in monkeys of the infection from a patient who died during the St. Louis epidemic of encephalitis Armstrong and Lillie[5] isolated a virus which produced specific lesions in monkeys and white mice, and which was immunologically distinct from that shown to be the cause of the St. Louis epidemic. In the next year Armstrong and Woolley[6] isolated two other strains of virus, this time from patients, which proved to be identical with the first, and they also showed that the sera of patients who had suffered from a form of meningitis from which they had recovered contained protective antibodies to the virus. Rivers and Scott[7] also isolated a virus from the cerebro-spinal fluid of two patients with lymphocytic meningitis, and proved this to be immunologically identical with that described by Armstrong and Lillie. Traub[8] was able to obtain the same virus from a strain of apparently normal mice used in his laboratory. It would thus appear that mice can harbour a virus which is capable of giving rise to a benign form of meningitis in man. In this country Findlay, Alcock, and Stern[9] have isolated a virus from the cerebro-spinal fluid of two patients suffering from obscure nervous disorders accompanied by pyrexia and associated with a lymphocytic pleocytosis in the cerebro-spinal fluid. A similar virus was isolated from apparently healthy mice and both viruses gave rise to a fatal lymphocytic meningitis on intracerebral inoculation into animals. Further, the sera of the human cases contained immune bodies both to the American strains isolated by Armstrong and Lillie and to the English mouse strain. There can therefore be little doubt that the virus recovered from the cerebro-spinal fluids of patients with nervous lesions in this country is, if not identical with, at least closely related to that isolated in America. The question of the method of transmission of the virus from mice to man is as yet unanswered. The practical side to this experimental work would seem to be the advisability of animal injection of cerebro-spinal fluid from every case of suspected meningitis with pleocytosis and a sterile fluid as a possible aid both to diagnosis and to prognosis.

[1] *Ann. Int. Med.*, 1936, ix, 1427.
[2] *Med. Journ. of Australia*, 1936, i, 576.
[3] *British Medical Journal*, 1935, ii, 1148.
[4] *Deut. med. Woch.*, 1936, xxii, 901.
[5] *U.S. Public Health Reports*, 1934, xlix, 1019.
[6] Ibid., 1935, l, 537.
[7] *Journ. Exper. Med.*, 1936, lxiii, 397, 415.
[8] *Science*, 1935, lxxxi, 298.

SURGICAL RESEARCH

The annual report of the Conservator of the Museum and Director of Research of the Royal College of Surgeons of England (Dr. John Beattie) demonstrates in no uncertain fashion the success of the forward policy adopted six years ago by the College Council. This policy has transformed the College from being but an examining body possessing a world-famous museum and an excellent library into a first-class research institution making use of these facilities in conjunction with well-appointed laboratories where young surgeons can investigate problems which have interested them in the course of their work. Since this policy was initiated we have recorded with pleasure the foundation of scholarships for surgical research at the College, the benefaction by Sir Buckston Browne to found the Research Farm at Downe, and now, in the past year, the gift of £25,000 by the Bernhard Baron Trustees to rebuild and equip the research laboratories on the College premises. On reading the annual report we have no doubt that the work it records will attract still further gifts to endow and expand the research which is being prosecuted under the auspices of the College. A thorough survey of the Museum collections is being undertaken preparatory to an extensive rearrangement and replacement of specimens. We note with pleasure that the Conservator and his assistants aim at nothing less than the creation at the College of what will be a national type pathological collection adequately documented and with complete histological data for each specimen. It is a courageous step to lay down such an ambitious programme, but the results of the progressive policy of the College augur well for its success in the future. The report also contains a detailed record of much unobtrusive but successful work in diverse fields, such as anthropology, human and comparative anatomy, pathology, odontology, and historical medicine. The part dealing with research activities is of the greatest interest. Investigations on surgical shock and intestinal strangulation have added much to

[9] *Lancet*, 1936, i, 650.

a proper understanding of these conditions, and it would appear that before long there will be made available many improved therapeutic measures for their relief. New ground has been opened up in cardiovascular and pulmonary surgery. The vexed problem of nerve grafting has been reinvestigated with results which will bear fruit when they are applied to human surgery. Apart from these severely practical applications it is gratifying to see that fundamental problems are also being investigated—the healing of wounds *in vitro*, the physiology of the hypothalamus, and the production of hypertension and glomerulonephritis. Even these do not exhaust the fields now under exploration. Details are included of the new research units which are being constructed. The arrangement of the new laboratories provides ample space for experimental research sufficient to accommodate from twelve to fifteen research workers. Many readers will be surprised to learn from this report that the College expends on scientific activities almost £11,000 per annum, of which only a little over £3,000 is covered by specific endowments. Perhaps in the near future it will be able to state that the whole of its scientific work is met from endowments for that purpose.

ARACHNODACTYLY

Since Marfan in 1896 drew attention to the syndrome of lengthening and thinning of the bones of the extremities many associated lesions have been recorded, so that to-day the syndrome embraces not only the spider-like digits so characteristic of the affection, but also a whole range of skeletal abnormalities, muscular dystrophies, ocular defects, and cardiac lesions. The familial incidence of the affection makes the picture still more striking, but the typical case, being "all arms and legs," can hardly be missed. Though a congenital disease, the affection is not obvious at birth; it generally becomes noticeable by the age of 4 and is definitely established by the tenth year. Among the skeletal defects, in addition to the characteristic digits which give their name to the syndrome, cranio-facial abnormalities have been reported, while thoracic deformities are present in 50 per cent. of cases, the funnel-shaped deformity being the most frequent. Kyphosis is also common, though it is possible that this is not a primary osseous defect but the consequence of the poor spinal musculature. In pronounced cases the muscle system in general is so poor as to suggest congenital amyotonia, but in contrast to amyotonia the muscle defect in arachnodactyly is not progressive. Flexure at the joints is occasionally seen, and in one case in which the hips were involved the characteristic chimpanzee-like posture was the consequence. The ocular defects, to which Ormond first drew attention in 1924, range from varying degrees of subluxation of the lenses to coloboma of the lens and anomalies in the iris and pupil. The incidence of cardiac lesions is given variously by different observers—up to 50 per cent. by some. The significance of arachnodactyly lies not so much in its intrinsic interest as in the possibility that the lesion in its milder forms is a frequent one, and that tall, lanky people, perpetually tired and incapable of putting on weight, may be examples of this. F. E. Burch in a recent survey of the subject[1] describes eight cases under his care which exhibit all the common variants. Little can be said on the aetiology of the condition. Available evidence suggests the possibility of the affection's being of a recessive character, though dominant types of inheritance have been recorded. One difficulty that arises is the fitting in of the presumably ectodermal eye lesions with the widespread mesoblastic changes seen in the bone and muscle defects. The possibility arises that the genes for eye and limb are carried in the same chromosome or are closely linked, particularly as of late other associations between eye and limb have been recorded.

[1] *Arch. Ophthalmol.*, 1936, xv, 645.

PATHOLOGICAL AND RADIOLOGICAL EXHIBITS

At the Oxford Annual Meeting last week the pathological exhibition was housed in the Sir William Dunn School of Pathology, where the Museum Committee had collected a wide range of exhibits. These were provided by the School of Pathology, the Radcliffe Infirmary, and some twenty institutions and individuals outside Oxford. A fine series of nearly eighty preparations illustrated pathological conditions of the spleen. Banti's disease, splenic anaemia, lymphadenoma, Gaucher's disease, and splenomedullary leukaemia were all represented; malformations and tuberculous conditions of the spleen were also shown, while there were three specimens of primary sarcomata. A number of preparations demonstrated the effect on the spleen of tropical diseases, among them a ruptured malarial spleen, and others typical of blackwater fever, kala-azar, bilharzial cirrhosis, and Egyptian splenomegaly. Another series devoted to the pathology of the lung included several varying forms of bronchiectasis; a number of these lung preparations were loaned by the Brompton Hospital. Sir Robert McCarrison contributed a comprehensive exhibit to illustrate the pathology of faulty nutrition by means of charts, photographs, and photomicrographs, which showed, for example, the effects of vitamin B deficiency on the nervous system and on the heart rate, and the production of heart lesions and infection by a diet deficient in vitamin C. Other items of interest included specimens illustrating pulmonary tuberculosis in children; pathological conditions of bones and joints; the effect on the spleen and bone marrow of experimental benzol poisoning; the life-history of the liver fluke; actinomyces; and a series of photographs illustrating radiological pelvimetry. The exhibition of radiographic prints was held in the University Museum buildings. The prints covered a wide range, illustrating many rare and unusual conditions. Dealing with the digestive system there was a series of fifty prints devoted to the appendix, and a large number showing pathological conditions of other parts of the alimentary tract. One excellent radiograph was of a stone in a common bile duct which had been injected with thorotrast. Radiographs of the chest showed, amongst other conditions, mediastinal abscess, paralysis of the diaphragm, dermoid cyst, and aneurysms. Long series depicted osteochondritis, arthritis, rheumatoid arthritis, and gout; examples of spondylitis, syphilis of bone, bone cysts, and various congenital deformities were also shown. An album made by Dr. S. Gilbert Scott illustrated the classification of arthritis of the hand with appropriate radiographs.

TREATMENT IN GENERAL PRACTICE

This article is one of a series on the management of some of the metabolic diseases met with in general practice. The first group of articles on Treatment in General Practice, thirty-five in number, was republished in book form last March by H. K. Lewis & Co., and a second volume will appear in the autumn.

TREATMENT OF SOME COMPLICATIONS OF DIABETES MELLITUS

BY

O. LEYTON, M.D., D.Sc., F.R.C.P.

PART I

Before giving details of the treatment of the complications of diabetes mellitus it should be stated that once some of the lesions have developed they cannot be cured. Prophylactic treatment is therefore of paramount importance, and consists in keeping the patient's metabolism as near normal as possible; when complications have developed maintenance of normal metabolism is the treatment essential to prevent further degeneration of tissue.

It has been found that the average diet of Europeans consists of six parts of carbohydrate, two parts of protein, and one part of fat. If we assume that insulin is the only substance which the patient suffering from pancreatic diabetes fails to make in sufficient quantity, his metabolism should be normal when he consumes a diet approximating to this ratio and is provided with adequate insulin. In a diet designed to supply sufficient energy to maintain weight and permit normal activity while keeping the metabolism normal, the carbohydrate cannot be limited to 150 grams a day as is advised by some authorities. Metabolism will probably be nearer normal when the concentration of sugar in the blood is kept between the limits found in health than when it is kept below the level at which glycosuria occurs. This means that sufficient insulin should be given to prevent the sugar rising at any time above 0.15 mg. per 100 c.cm. of blood. Possibly in pituitary diabetes mellitus the anterior lobe of the pituitary secretes simultaneously an excess of the diabetogenic factor and an abnormal substance which causes arteriosclerosis. This possibility does not, however, diminish the advisability of attempting to keep the metabolism close to the average normal.

Arteriosclerosis[1]

Before the advent of insulin arteriosclerosis, along with a raised blood pressure, was recognized as a common sequel to long-standing diabetes mellitus. The fact that females were affected as often as males made it probable that it was the disease, or the treatment of the disease, that led to this condition. Evidence has been accumulating that the diet containing much fat and little carbohydrate at one time customary was, in fact, responsible for the changes in the arteries; but even if this had been known then it would not have affected treatment, because in those days the physician had no choice. If the patient was to survive he had to be supplied with a certain amount of energy in a form which he could utilize. Insulin has changed this, and subsidizing the pancreas allows us to give the patient a suitable balanced diet.

For many years iodine has been prescribed in hypertension and arteriosclerosis. Any improvement following its administration has been attributed to its anti-luetic properties, but recent animal experiments have shown that iodine inhibits the production of arterial changes by high fat diets. Either iodides or some compound of iodine and oil should be prescribed in doses sufficient to ensure the absorption of 5 grains of iodine daily. At least 7 grains of potassium iodide, or iodinol (20 per cent. iodine) one six-minim capsule four times a day should be given.

Coronary Thrombosis and Angina Pectoris

Coronary thrombosis may follow arteriosclerosis of the coronary vessels, and is treated by rest and analgesics. The analgesics morphine, 1/4 grain, and its derivatives, diamorphine (heroin), 1/6 grain, and dihydromorphine hydrochloride (dilaudid), 1/32 grain, may be given in diabetes mellitus. The obstruction of the artery renders that part of the heart muscle supplied by it ischaemic. This, in turn, leads to fibrosis, and during this process substances are liberated which interfere with the action of insulin, necessitating a temporary increase in the dosage.

Angina pectoris is due to a transient ischaemia of the heart caused by a spasm of the coronary artery. The recurrence of anginal attacks depends upon factors about which very little is known, so it is difficult to decide whether hyperglycaemia or hypoglycaemia increases the frequency and intensity of attacks. That the T wave is depressed during hypoglycaemia is part of the evidence cited in favour of the hypothesis that the heart becomes accustomed in long-standing diabetes to an excess of sugar in the blood supplying it, and that its action may be impaired by a sudden reduction in that concentration. On the other hand, many observers have seen diabetic patients with frequent anginal attacks improve considerably after the adoption of adequate treatment. It seems advisable, however, to prevent any sudden change in the concentration of sugar in the blood of these patients, and therefore when treatment with insulin is adopted the doses should only be increased very slowly.[2]

Cerebral Haemorrhage and Thrombosis

In spite of these accidents being fairly common in long-standing cases of diabetes mellitus it is not safe to assume that sudden loss of consciousness is due to cerebral haemorrhage or thrombosis, even when it is associated with laboured breathing, muscular spasm, or even hemiplegia and extensor plantar responses. Hypoglycaemia may produce these effects and sugar will save the patient's life, while the usual treatment by starvation will prove fatal. If there be the shadow of a doubt half a pint of warm aqueous solution of glucose (10 per cent.) should be given per rectum and the sugar content of the blood estimated. Should the blood sugar be above 0.12 mg. per 100 c.cm. then the patient should be treated as described previously in this series,[3] but with one essential difference. The non-diabetic may be allowed to go without food for several days, but the advanced diabetic will develop ketosis and die if deprived of carbohydrate for any length of time. If there is any acetone in the urine or in the blood the patient should be supplied with orange juice, about two pints a day, or glucose lemonade in quantities sufficient to ensure an intake of 100 grams of carbohydrate daily. Patients who are unable to swallow should have a 20 per cent. solution of dextrose injected intravenously; 125 c.cm. four times a day, along with

insulin, is enough to make certain that the carbohydrate is katabolized. The sugar content of the blood should be estimated often enough to guard against coma due to cerebral disturbance passing into hypoglycaemic coma.

Vitreous Haemorrhage

Haemorrhage into the vitreous humour is usually associated with the presence of a septic focus, in addition to diabetes and hypertension. Such a source of infection should be treated by extirpation or drainage when possible, while the metabolism of the patient is made to approach normal. An attempt to reduce hypertension may be made by giving sodium thiocyanate, 3 grains, well diluted with water, twice daily after meals, so long as it does not cause giddiness or nausea. If this fails the effect of reducing the daily intake of salt to 5 grains may be tried; patients who react satisfactorily to such treatment may be kept upon a low salt diet until their appetites flag.

Endarteritis Obliterans

Endarteritis obliterans and thrombo-angiitis obliterans both give rise to the characteristic syndrome of intermittent claudication; the onset is very slow when due to the former and comparatively rapid when due to the latter disease. Endarteritis obliterans is progressive, thrombo-angiitis may retrogress; both may cause pain, even while the limb is at rest. The diagnosis may be confirmed with the oscillometer, which will show that the pulse in the affected arteries is of very small volume or else apparently non-existent. An attempt should be made to arrest the progress of the disease by prescribing a diet consisting chiefly of carbohydrates. Auxiliary methods of treatment which may be of assistance include exercises (notably Buerger's), douches, diathermy, drugs, and perhaps, in some cases, sympathectomy.

BUERGER'S EXERCISES

The patient lies on his back in bed and the foot is supported on a padded hinged board at the greatest height that does not cause discomfort. The leg is kept in this position until it is blanched, but never for more than three minutes. Next the foot is hung over the edge of the bed until it has become a good red colour. The limb is then placed horizontally in a well-warmed cradle for two to five minutes. This cycle is repeated six to seven times.

The treatment is applied three times a day to begin with, and is gradually increased up to six times. The length of time for which the leg is elevated should be diminished if pain is caused by the postural ischaemia. In addition, hot and cold douches may be applied to the leg for one minute each and alternated three times.

DIATHERMY AND DRUGS

Short-wave diathermy has been used with encouraging results; in some cases an increase in the volume of the pulse at the ankle has been observed, and this increase has persisted for hours after the treatment has ceased.

In advanced endarteritis dramatic results cannot be expected from drugs, and their effect is less than in thrombo-angiitis obliterans because the collateral vessels are affected as well as the main arteries, so that inhibition or lowering of the arterial tone will produce only a small effect. Anti-spasmodics, such as acetylcholine 0.05 to 0.2 gram, adenosine 0.005 to 0.01 gram, and extracts of skeletal muscle, such as carnacton, locarnol, myoston, and padutin, may be injected subcutaneously or intramuscularly four or more times daily; occasionally these will relieve pain, but curiously enough in the absence of pain they may cause it in the legs, and such pain is in no wise evanescent.

It is difficult to satisfy oneself that the effect produced by drugs in an advanced case of endarteritis obliterans is greater than that which might be expected from suggestion following the administration of a costly preparation. The oscillometer fails to show even the minutest increase in the volume of the pulse, but nevertheless some patients with threatened gangrene of the foot in which coldness and purple patches have led to anxiety have attributed the arrest of the disease to daily injections of adenosine and preparations containing that substance.

SURGERY

Thrombo-angiitis obliterans has been treated successfully by lumbar ganglionectomy. Before submitting the patient to operation, observations must be made to determine the skin temperature of the limb before and during the inhibition of vascular tone, either by spinal anaesthesia or by artificial pyrexia, but this can only be done if the case is not too advanced, since neither spinal anaesthesia nor artificial pyrexia is completely devoid of risk. The difference of the skin temperatures at the wrist and the ankle may be from 10° to 20° F. If under spinal anaesthesia the difference in temperature falls to 4° F. or less, then operation is indicated. But in the majority of cases of endarteritis obliterans in which symptoms have developed the rise in skin temperature is negligible.

Peri-arterial sympathectomy appears to have been followed by a recession of the symptoms in several cases. If the improvement is due to the operation the explanation remains a mystery. Some attribute the effect to the absorption of products of damaged tissues, and assert that incisions at other sites would be equally efficacious.

Gangrene

When the lumen of the arteries is nearly obliterated the blood supply to the tissues may be just adequate to maintain life but unable to meet the emergencies of trauma or infection. Such an emergency often initiates gangrene in a foot which otherwise might have remained useful for months or even years.

The feet, therefore, must be protected from trauma and infection by the wearing of well-fitting shoes or, preferably, boots and woollen socks or stockings that diminish the chance of the development of blisters and callosities. Corns should be removed either by rubbing with a piece of shark's skin or by a sharp instrument in clean skilled hands, care being taken to avoid drawing blood. A chiropodist should be told that his client has diabetes, in order that stringent asepsis be adopted. The toe nails should be kept short. The feet should be washed with soap and water daily and kept at least as clean as the face. After washing they should be dried most carefully and powdered with finely divided boric acid. If the skin is scaly or sodden or the nails are deformed it is probable that a fungus is growing, and a compound benzoic acid ointment should therefore be applied daily:

℞	Salicylic acid	1 part
	Benzoic acid	1 ,,
	Coconut oil	12 parts
	Soft paraffin	16 ,,

Special attention should be paid to the skin between the toes, which is very vulnerable to infection, and is often the site of commencing gangrene.

HYPOTONIC SALINE BATHS

The treatment of gangrene in the London Hospital consists of immersion of the affected part in hot salt baths for periods of fifteen minutes three times a day. The concentration of salt is about 2 per cent. (two ounces of common salt to five pints of hot water), and the temperature as hot as the patient can stand it. It may be 105° F. at first and be increased by the addition of hot

salt water to a temperature not exceeding 120° F. A few patients find the hypertonic bath very painful, and for these the concentration of salt must be decreased. After the bath the foot is washed with hot water, dried, sponged with industrial spirit, dried with a warm towel, powdered with boric acid, covered with one layer of gauze to keep off flies, and placed in a cradle which is heated by electric lamps. The clothes over the cradle are arranged to allow ventilation ; the size and number of lamps are chosen to keep the temperature as high as the patient can bear it without discomfort. When there is any discharge and the caked boric acid and pus do not come away in the hot salt bath, boric acid fomentations are applied to soften the mass.

HERRMANN'S "PAVAEX"

During the last few years Herrmann's "pavaex" apparatus has been used to increase the blood supply in cases of endarteritis and dry gangrene. The leg is placed in a rigid container, the air in which is rarefied to a negative pressure of 60 to 80 mm. Hg for about twenty-five seconds. A positive pressure of 20 to 40 mm. Hg is then applied for five seconds. An increase of the blood supply to the leg resulting from this treatment will be demonstrable by a rise in the temperature of the foot. The treatment should be applied daily for a period of up to one hour, provided the constricting cuff encircling the thigh does not cause too great discomfort. Cases in which emboli may be dislodged or sepsis may spread are unsuitable. If the gangrene is moist and there is no hope of saving a toe local amputation may be considered, but this operation succeeds so rarely when there is no pulse at the ankle that it is usually a waste of time.

SYME'S AMPUTATION

It is difficult to believe, but nevertheless it is true, that Syme's amputation succeeds in a sufficiently large number of cases to make it not only justifiable but preferable to amputation below the knee, even when the obliterative process is so advanced that ligation of the vessels is unnecessary. It is usually wise, therefore, to delay operation for just so long as a Syme's amputation is still possible, but no longer. The anaesthetic must be chosen carefully: chloroform and ether must not be used, but nitrous oxide is harmless to most diabetics, and may be employed in conjunction with evipan, avertin, or nembutal. It is unwise to try to make a patient give consent to an amputation by telling him that he may lose his leg, if not his life, by refusing, because occasionally the most unpromising feet heal when subjected to the treatment detailed above, provided the blood sugar is kept within the limits of 0.08 to 0.15 mg. per 100 c.cm. of blood. It is safest to say that operation will probably save time, but that no one can prophesy how long the stump will take to heal.

REFERENCES
[1] *British Medical Journal*, 1935, i, 1034.
[2] Ibid., 1935, i, 989.
[3] Ibid., 1935, ii, 464.

(To be continued)

P. Fischhof (*Med. Klinik*, June 12th, p. 807) records his observations on six sporadic cases of exanthema subitum, which he saw in a relatively short time (October, 1934, to January, 1936) in infants aged from 6½ to 17 months. No epidemiological relations could be found between the exanthema and attacks of influenza occurring in adults at the same time. Some of the cases had catarrhal symptoms, while others had none. The common feature in all was the characteristic rash on the trunk and the typical blood picture, leucopenia with relative lymphocytosis, after the temperature had become normal.

AIR RAID PRECAUTIONS AND THE MEDICAL PROFESSION

National schemes for the protection of the civil population of this country in case of hostile air attack are being prepared by the Air Raid Precautions Department of the Home Office (5, Princes Street, London, S.W.1) in close co-operation with local authorities. These precautions must be taken in time of peace, not because there is any immediate threat of war or because war is considered to be inevitable, but because the range, speed, and capacity of modern aircraft are such as might enable sudden attacks to be made on a very heavy scale—attacks which would cause great damage and suffering if no previous organizations had been thought out to help to deal with them—and, in view of the speed with which air attack could be delivered, last minute improvisation would be impossible.

Air raid precautions are an essential corollary to the active defence of the country. They can in no way supersede it, but have as their object the devising of measures to maintain the morale of the population and to enable the life of the country to be continued, even though on a modified scale.

Need for Medical Co-operation

The Air Raid Precautions Department attaches the greatest importance to an understanding of the problems associated with air attack by members of the medical profession. Although a convention exists prohibiting the use of gas offensively in time of war, the possibility of this weapon being employed cannot be entirely discounted, and its effects might be disastrous if no previous preparations had been taken. It is in this aspect that the interest of the medical profession is particularly desired, not only in regard to the clinical knowledge of how to deal with possible victims, but also in all the details of prevention and protection.

The training of the medical profession is regarded as a matter of first national importance, because if an emergency arose there could be little question but that the general public would turn to their medical advisers for help and assistance. In time of peace it is also conceivable that their advice might be asked on matters of this kind. The Air Raid Precautions Department has discussed the whole position with the General Medical Council, the British Medical Association, and the deans of the medical schools throughout the country. As a result a scheme has been devised which will, it is hoped, if it receives the support of the profession, achieve the desired result.

Courses of Instruction

The scheme is generally designed to cover the instruction of graduates, undergraduates, and members of the nursing profession. It consists in the provision of specially selected and trained medical men, who would conduct special courses under the auspices of the deans of the medical schools, the British Medical Association, and the General Nursing Council. The courses proposed would be both theoretical and practical ; the latter representing approximately 50 per cent. of the instructional time, and including personal experience in wearing a modern type of respirator in actual gas. Courses would probably consist of some six or eight attendances, and would be arranged at suitable places, hours, and intervals to suit the convenience of those concerned. Since there is a good deal of new ground to be covered it is felt that these periods represent the minimum of attendances necessary to attain the required standard in all aspects of the subject.

The instructors provided by the Air Raid Precautions Department will arrange to travel about the country, and will be provided with special equipment to enable them to give the necessary practical instruction at convenient centres. Their operations will be within the respective areas of the British Medical Association Branches at selected centres.

Courses will not be confined to members of the British Medical Association, but will be open to any registered doctor, dentist, or nurse.

ONE HUNDRED AND FOURTH ANNUAL MEETING

of the

British Medical Association

HELD IN OXFORD, JULY, 1936

THE SECTIONS

SUMMARY OF PROCEEDINGS

During the next few months there will be published in the British Medical Journal *the opening papers communicated to the Scientific Sections of the Annual Meeting at Oxford. The reports of discussions in this and successive issues are intended to give members who were not present a general idea of the proceedings.*

SECTION OF MEDICINE

Wednesday, July 22nd

The Treatment of Chronic Rheumatism

With Dr. A. G. Gibson, President of the Section, in the chair, the discussion on the treatment of chronic rheumatism was opened by Dr. H. Letheby Tidy. He regarded rheumatoid arthritis, osteo-arthritis, and fibrositis as the three principal groups included in the term "chronic rheumatism." A search should be made for a septic focus; only if such were definitely identified was vaccine treatment justifiable. Among drugs gold was the only one for which a specific effect could be claimed, but this method required care both in use and in assessment. Schemes of dieting derived their chief effect from alteration in weight, and the opener did not regard thyroid as exercising any specific beneficial effect in chronic rheumatism. The object of treatment in the acute stages was to provide absolute rest and at the same time prevent deformities and adhesions; hence the use of splinting and a single movement of each joint each day. Heat was indicated in all forms of chronic rheumatism, and this might be applied locally or by electrical and balneological methods. Dr. Tidy confessed scepticism regarding the special effects claimed for the waters of particulars spas, but admitted the advantages to be obtained by the external use of such waters through their physical effects upon the skin. He held that all physical treatment and balneotherapy should be under the sufficient supervision of a medical man.

Dr. R. G. Abercrombie (Sheffield) stressed the importance of the psychological element. The disposition and mental state of the patient might influence the effect of treatment not only through the repression or exaggeration of painful stimuli, but also by the direct effect of the mind upon the tissues. As examples he quoted the physiopathic hand, seen most commonly in military practice, and the "post-sciatic hysteria" which is sometimes a relic of acute sciatica. Another problem in treatment of chronic rheumatism was the chronic pain in the back so often associated with vague ill-health and vague mental depression. He felt that one of the aims of therapy was to restore confidence, and consequently institutional treatment would fail if it did not succeed in reinforcing the morale of the patient. The adventitious aids in chronic rheumatism were important, notably suitable supports for the knee and foot where necessary. The help of a good surgical instrument maker sometimes proved to be invaluable.

Dr. C. W. Buckley (Buxton) spoke on certain aspects of physical treatment. He agreed with Dr. Tidy on the subjects of rest and movement for affected limbs, but regarded the use of heat, particularly moist heat, as of particular benefit. In general, the prolonged use of moderate warmth was more advantageous than shorter periods of greater intensity. In this connexion he quoted the dictum of Openshaw that a flannel bandage was of more value than many complicated applications. Massage often inflicted new trauma on tissues already inflamed, whereas the effects of deep baths would frequently be beneficial. Regarding the question of absorption through the skin, he believed that some transfer did take place, but that probably the factor of skin stimulation was more important.

Mr. G. R. Girdlestone (Oxford) felt that the attitude of the orthopaedic surgeon to chronic rheumatism should be that of a "biologically minded mechanic." Usually the role of surgery in rheumatoid arthritis was the relief of pain, while in osteo-arthritis it was the correction of deformity. From the standpoint of treatment he separated the polyarticular fusiform type of rheumatism from the periarticular form associated with round-celled infiltration. The former group required a persuasive and very slow passive movement, while the latter required manipulation in the later stage for the breaking down of adhesions. Various operative procedures, useful according to the type and stage of the disease—such as lumbar sympathectomy, arthrodesis, and arthroplasty—were described.

Dr. Kerr Pringle (Harrogate) stressed the importance of accurate diagnosis. He considered that gout was a factor too often ignored at the present day, and took the view that a large number of cases were of metabolic origin. Physical treatment, like salicylates, while a valuable ancillary to general systemic treatment, could not cure. Dr. G. D. Kersley (Bath) felt that spas had in some measure earned the scepticism expressed by Dr. Tidy. However, they did afford a complete change for the patient, and brought together the various remedies available. For acute rheumatoid arthritis he urged the use of gentle manipulation, preferably in tepid water, as a means of relaxing spasm and neutralizing the effect of gravity. He demonstrated a light splint for the prevention of ulnar deviation of the hand and fingers in arthritis of the wrist.

Dr. W. S. C. Copeman felt that a new outlook was required rather than a new remedy, and that surgeons were apt to concentrate too much on remedial operations. The proper role of surgery should be rather the prevention of deformity by co-operation with the physician during the acute stages. Dr. L. S. Potter (Buxton) distinguished between active or passive congestion in joints. The former was characterized by an increase of pain during activity, while in the latter condition pain was worse during rest and gradually wore off in the course of movements. Counter-irritation was indicated when active congestion was present. Dr. Gerald Slot spoke on gold therapy. This method had now passed the experimental stage, and, provided the technique and the case were suitable, gave good results. Although blood crises and dermatitis were possible ill effects, he had not seen any reactions severe enough to cause anxiety. Dr. J. B. Burt (Bath) held that radioactivity in spa waters might well be beneficial through the action of β rays, which could penetrate the skin. He thought that physicians should keep a more open mind regarding the possibilities of various forms of treatment. Dr. H. Balme (Lingfield) spoke as a patient, and regretted that even among experts there was no agreement regarding a definite programme of treatment in any particular case. Much was heard of this or that treatment in "appropriate cases," but these were never exactly defined.

In reply, Dr. Tidy defended the principle of "multiple" treatment in chronic rheumatism. He was still unrepentant on the subject of spa treatment, and thought it was up to them to find arguments in their favour. He agreed that gold therapy was sometimes effective, but regarded its reputed specific effect still as an open question.

SECTION OF SURGERY

Wednesday, July 22nd

Demonstrations on Experimental Research

With Professor G. E. GASK, President of the Section, in the chair, a series of demonstrations on experimental research was given at the morning session by representatives from the Royal College of Surgeons Research Laboratories, the Buckston Browne Research Farm, Downe, Kent, and the Surgical Research Department, University of Edinburgh.

Experimental Hypertension

Mr. R. J. KELLAR (Edinburgh), in a paper on experimental hypertension, described a method of producing experimental glomerulonephritis in rabbits with a serum prepared from ducks. An ingenious method of measuring the blood pressure in these animals by means of an isolated carotid loop was also demonstrated. After injection of the serum it was noted that there was a latent period of from seven to twelve days before the blood pressure began to rise. Albuminuria appeared after the onset of hypertension and not before. This method of producing changes in the kidneys was much superior to the previously investigated oxalate nephritis, which is only a transient phenomenon. Dr. W. M. ARNOTT (Edinburgh) described a preliminary series of experiments using this form of glomerulonephritis. Rabbits which had had the right kidney removed and the left denervated did not get hypertension after the production of the serum nephritis. The right kidney was removed because of the difficulty of its total denervation. The conclusion was that integrity of the renal nerves was essential for the development of the hypertension of renal damage.

Mr. L. F. O'SHAUGHNESSY and Dr. D. SLOME briefly reviewed the work they had done to determine the aetiology of traumatic shock. They produced evidence eliminating the fluid loss factor and the production of tissue toxins, and showed photographs, obtained by means of a cathode-ray oscillograph, of nerve impulses which their investigations had proved to be continuously discharged from the traumatized area during the period of the fall in blood pressure.

Intestinal Strangulation

Dr. SLOME also gave an account of experiments carried out in conjunction with Mr. G. C. KNIGHT on the toxic factor in intestinal strangulation. He produced evidence that a toxin, which has been shown to cause marked depression of blood pressure, and even death, when injected intravenously into a normal animal, arises within the wall of the strangulated segment of the intestine and passes from there into the venous blood and lymphatics. This toxin appeared to be a new product formed as a direct result of strangulation, and not a substance previously existing in the gut lumen, which was merely absorbed. Experiments were described showing the presence in high concentration of a similar depressor substance in the dialysate of the urine and, after a period of twelve hours' strangulation, in the peritoneal fluid of patients with intestinal strangulation. Early results of attempts to identify this depressor substance indicated that it differed from histamine and from acetylcholine.

Mr. IAN AIRD and Dr. W. K. HENDERSON (Edinburgh) also reported the results of experiments in intestinal strangulation, in which they had found that if an intestinal loop of medium length was subjected to complete venous strangulation, and if peritoneal absorption of the transudate from the loop was prevented by enclosing the loop within a rubber bag, the experimental animal would live indefinitely. The transudate contained at least two toxic elements: one was a complex protein, a euglobulin, in all probability a mixture of bacterial toxins; the other was diffusible, and appeared to be histamine, since the histamine content of the transudate increased progressively to a maximum concentration of 1 in 5,000 to 1 in 20,000 after twenty-four hours. This indicated the importance of removing all blood-stained peritoneal transudate at the time of operation in cases of clinical strangulation. Regarding still viable strangulated loops, they had found that if a long intestinal loop was distended, returned to the abdomen, and deflated later, the consequent effect on the blood pressure was a variable one. If distension was maintained for less than six or eight hours its release was followed by a rise in blood pressure. If it was maintained for more than six or eight hours its release then was followed by a fall in blood pressure and sometimes by death, even after complete denervation of the distended loop. This suggested strongly that the blood stagnating in the distended bowel vessels became endowed with depressor properties, the effect of which was exercised when the distension and congestion was relieved. After release of long-maintained intestinal distension and congestion the portal blood appeared to contain detectable amounts of diffusible depressor material. This lent support to those who advocated more frequent resection of strangulated but still viable loops, and encouraged those who sought a practical method of gradual decompression of obstructed bowel.

Toxicity of Fluid from Burned Areas

Mr. A. N. ROXBURGH (Edinburgh) reported work carried out in conjunction with Mr. J. S. JEFFREY and Mr. W. C. WILSON (Edinburgh), upon the toxicity of oedema fluid from burned areas. They had found that this fluid in experimental animals gradually acquired toxic properties which were not dependent upon the action of bacteria. The toxin was a higher protein derivative associated mainly with the globulin fraction, and was presumably a result of autolysis of devitalized tissue. It was neurotoxic and vaso-depressor, and produced degeneration of liver cells.

Mr. W. A. D'A. ADAMSON (Edinburgh) demonstrated an apparatus devised for the purpose of stimulating autonomic nerves in an unanaesthetized animal. The stimulation could be carried out at intervals over periods of months. A coil of 500 turns of fine copper wire was buried within an animal. A rectifier was attached to this coil and the electrodes were led to the nerve to be stimulated. A current was induced in the coil by passing a high-frequency current through these coils arranged outside the animal's cage. This current gave a tetanizing effect after its passage through the rectifier.

Mr. J. R. J. CAMERON (Edinburgh) presented a preliminary communication on experimental observations on the use of skin as a living suture. A series of animal experiments had been performed to study the behaviour and utility of the cutaneous connective tissue when employed as a deep graft in various forms to repair artificially produced defects. The skin of pigs was used as auto-transplants to reconstruct the abdominal wall and to replace tendons. It formed firm fibrous plates and tendinous cords, and its value as a reconstructive agent in surgery had been proved. Survival of dermal and epidermal epithelium was, however, a disadvantage. Gross sepsis had not occurred.

Nerve Grafts

Mr. F. H. BENTLEY gave a brief description of an investigation, carried out in association with Miss MARGARET HILL, into the relative value of fresh and degenerated nerve grafts, both autogenous and homogeneous. He demonstrated that there was no difference in the time of recovery of physiological function between animals which have had fresh and those which have had degenerated grafts. He showed also that the number of new growing axons which pass into the distal segment of the nerve was determined by the amount of scar tissue formed at the junction of the nerve with the graft. The conclusion was that absolute accuracy of approximation and almost exact equality of size of the cut ends of the graft and nerve were essential to reduce the production of scar tissue to a minimum and thus to obtain the best results.

Mr. A. S. KERR, describing his investigations, in collaboration with Dr. JOHN BEATTIE, into the control of visceral activity by the hypothalamus, said that systematic exploration of the hypothalamus, carried out

by means of a modified stereotaxic instrument, originally designed by Mr. H. S. Souttar, had demonstrated that the most anterior region of the hypothalamus, the supra-optic area, would, on stimulation, lead to an increase in bladder tonus. Stimulation of the more distal parts of the hypothalamus and upper mid-brain produced the reverse of this effect. He also gave a preliminary account of attempts to obtain some indication, by means of a sensitive cathode-ray oscillograph, of the electrical activity of the hypothalamus. These had been performed to determine what share the hypothalamus had, if any, in the action potentials which had been recorded from the surface of the brain.

Commenting generally on the papers and demonstrations which had been presented, Dr. BEATTIE said that both the Edinburgh and the London schools had come to the conclusion that the cause of death in intestinal strangulation was due to pressor and depressor substances, which had now to be identified and a line of treatment elaborated. Excision of still viable segments of intestine sounded a severe measure, but there seemed to be evidence for it. The investigations upon the hypothalamus might lead in time to a proper understanding of visceral activity and behaviour.

Sir DAVID WILKIE said that the practical issues from the studies of intestinal strangulation were that doubtful loops should be resected, that there should be gradual relief of distension, and that the peritoneal cavity must be emptied of transudate.

Viruses in Relation to Cancer

At the afternoon session Dr. W. E. GYE, Dr. L. FOULDS, Dr. F. SELBIE, and Dr. C. RUSSELL AMIES gave a demonstration of viruses in relation to cancer. In cancer it was known that most tumours of birds could be propagated by cell-free filtrates, and were therefore caused by viruses, and in at least one tumour of a mammal, the Shope papilloma, a causative virus could be demonstrated.

SECTION OF OBSTETRICS AND GYNAECOLOGY

Wednesday, July 22nd

Maternity Services

The opening paper was by Sir EWEN MACLEAN (Cardiff), Professor H. BECKWITH WHITEHOUSE (Birmingham) being in the chair.

Sir Ewen Maclean, reviewing the present maternity services, drew attention to the good that had resulted from more general ante-natal and post-natal care, and to the fact that more thorough training in the hospitals had enabled the practitioner efficiently to supervise the pregnancies of his patients in cases where ante-natal clinics were not available. No proposed maternity service could afford to neglect the importance of the general practitioner, since the majority of confinements still took place in the patients' own homes. Finally he appealed for good will and co-operation on the part of all the personnel and institutions that might be included in any national maternity service, but considered that representative central and local advisory boards with responsible status would be necessary for this essential element to success to be fully realized.

Professor F. J. BROWNE agreed that the services of the general practitioner were indispensable to any national maternity service. He deplored the inadequate training of the present-day medical student in obstetrics. This he attributed partly to the small number of maternity beds in the modern teaching hospital in relation to the numbers of students trained. The student should be thoroughly instructed in the conduct of normal pregnancy and labour, in the early recognition of emergencies, and in the treatment of their more common varieties. Graver abnormalities should be left to specialists, for in these times of rapid communications and transport there was little excuse for continuing treatment in the patient's own home. He suggested that any future maternity service should be staffed by specialists, and that one or two such experimental units might be established in the "black areas."

Dr. WYNDHAM PARKER (Worcester) welcomed the raised status of midwives that would result from the new Bill. There was, he said, little to bear out the often-repeated assertion that normal midwifery cases were passing from the hands of practitioners to those of the midwives. The increasing number of deaths from septic abortion were swelling the figures of maternal mortality, and he suggested that the two might well be considered in different categories. The present ante-natal services should be extended and improved, and abnormal cases should be confined in hospital rather than in the patients' homes.

Dr. R. E. MOYES (Morpeth) told of the experiences of a practitioner in an industrial area. He had found that in recent years patients showed much greater confidence in hospitals, and were quite ready to enter them for their confinements. There was no organized ante-natal service in his area, but arrangements could be made for the patient to be sent to a consultant or be seen in her own home if necessary. Every pregnant woman should be seen by a medical practitioner, and only normal deliveries should be conducted by a midwife. It was his experience that most minor emergencies could be dealt with by the practitioner, and in graver cases specialists should be within easy call to attend at the patient's own home. He suggested that the local authority should supply aseptic equipment for the confinement and special nurses to care for suspect and infected cases, and also that provision should be made for the payment of anaesthetists when called in for emergencies.

Dr. A. T. JONES (Mountain Ash) described the conditions obtaining in one of the black areas—namely, the mining valleys of South Wales. In past years the birth rate in these districts had been very high and large families very common. Of late the depression had caused a change, and marriage was later and families smaller. Asepsis, he said, was difficult to preserve when conducting a confinement in an overcrowded mining cottage, and the provision of a maternity hospital in his area in 1926 was followed by a striking fall in the morbidity rate and the deaths from puerperal sepsis. The position was still far from satisfactory, and he advocated the more general establishment of ante-natal supervision in the district.

Dr. N. C. PENROSE (Banbury), speaking as a practitioner in a rural district, disagreed with Dr. Wyndham Parker, and considered that the midwife was seriously encroaching on the medical practitioner's obstetric practice, this tending to limit the latter's experience in normal cases. He thought that in rural areas ante-natal clinics were of little use, and that supervision during the pregnancy should be by the doctor who attended the confinement. Any maternity service should provide for the payment of practitioners when required.

Professor J. C. WINDEYER (Sydney) agreed with Professor Browne that training in obstetrics left much to be desired. The present method of instruction was not only too short, but also too concentrated; in his own hospital the course was spread over three years. Critics of modern teaching methods had stated that no fall in maternal mortality statistics had occurred, but in his opinion the full results of improved teaching would not be felt for many years after the doctor had qualified. Already in New South Wales the death rate from puerperal sepsis had fallen very considerably. Professor E. FARQUHAR MURRAY (Newcastle) stressed the importance of whole-hearted co-operation with the public health authorities in any proposed maternity service. Far too many cases in the training schools were given to the student midwives, the majority of whom would never practise. He advocated fully trained midwives to work in co-operation with doctors, a special nurse for "suspect" or infected cases, and the provision of aseptic obstetric dressings by the local authority. Mr. R. H. J. M. CORBET (Dublin) said that maternity services were not fully organized in his district, but that schemes for their improvement were already in hand. Professor WHITEHOUSE said that there was too much teaching in obscure conditions in the medical curriculum, and there was a tendency, which he deplored, to make a specialist of every student. There was little warning of emergencies in obstetrics, and

he advocated the provision of small hostels in necessitous areas to which patients could be removed with no loss of time in case of need. Antiseptic obstetric dressings would be of greater value than aseptic when employed by midwives.

Ergometrine

Mr. J. CHASSAR MOIR read a paper on clinical experiences with ergometrine, Dr. F. G. PROUDFOOT (Oxford) being in the chair.

Mr. Moir remarked that in 1932 he had called attention to the fact that the clinical action of ergot on the uterus was not mainly due to ergotamine or ergotoxine, but that some unknown alkaloid must also be present. In 1935 this alkaloid was isolated in this country and given the name of ergometrine. Reports from foreign countries that further active principles had been isolated had proved false, all these substances being identical with ergometrine. Ergometrine had a much smaller molecule than the other ergot alkaloids, and was a highly active substance, causing powerful contractions of the puerperal uterus without other unpleasant effects; also there was no risk of the development of peripheral gangrene, which might result from prolonged treatment with ergotamine. In the case of the post-partum uterus, ergometrine did not cause a continuous spasm, but a series of rapidly repeated single contractions, so that complete relaxation did not occur in the early stages after its administration. The action was prolonged, usually lasting three or four hours at least, after which there was no contraindication to a second dose if necessary.

The chief indication for the use of the drug was the prevention and treatment of post-partum haemorrhage after the third stage of labour, and where rapid action was required it could safely be given intravenously. The points in its favour in such conditions were that it was less erratic in its action than pituitrin, and the danger of shock was eliminated. Other suggested uses for ergometrine were in Caesarean section, incomplete abortion, and certain cases of menorrhagia, though in such conditions its action did not appear to be much superior to that of pituitrin. He did not believe that the administration of ergot affected the rate of involution of the post-partum uterus; attempts to hasten this probably did more harm than good, especially when uterine sepsis was present. The drug was entirely unsuitable for use during labour itself, as it had a variable action on the uterine contractions and foetal death often ensued. Mr. Moir suggested that the time had arrived for the investigation of the action of ergometrine in the treatment of migraine and exophthalmic goitre, and concluded by saying that wherever there were indications for ergot therapy the new drug should be used, as it was far more efficient and completely supplanted the older preparations.

At the end of the talk a film was shown which demonstrated in a simple but practical manner the rapid and powerful action of ergometrine on the post-partum human uterus.

SECTION OF OPHTHALMOLOGY

Wednesday, July 22nd

Tuberculosis of the Eye

With the President, Mr. P. E. H. ADAMS (Oxford) in the chair, Mr. F. A. WILLIAMSON-NOBLE opened a discussion on the tubercle bacillus as the cause of obscure disease of the eye.

Apart from some clearly defined tuberculous lesions of the eye, he said, there were a larger number of conditions which were regarded as tuberculous in origin by some observers, particularly on the Continent. The evidence in such conditions was inconclusive, being based on indirect deductions rather than on established clinical facts. The experimental work of Finnoff and others showed that not only living tubercle bacilli, but the dead organisms, could produce eye lesions when injected into the circulation. Further, the lesions were much more virulent if the animal was first sensitized to the tubercle bacillus. But, on the other hand, ocular lesions were rare in patients suffering from frank tuberculosis, and the proofs that the many conditions ascribed to tuberculosis occurred in latent forms of that disease were open to serious objections. Neither the Mantoux test nor the Verne test could be regarded as conclusive evidence. Some authorities fell back upon the therapeutic proof of tuberculin; but here again a number of objections could be raised, for there was evidence that tuberculin acted in a non-specific manner. In the speaker's opinion focal and general reactions in the course of tuberculin treatment were probably the least objectionable proof of the tuberculous aetiology of a doubtful lesion. As regards the mode of action of the tubercle bacillus, Mr. Williamson-Noble was inclined to attach more importance to allergic reactions than to the lodgement of tubercle bacilli or the action of tuberculous toxins. The problem was bound up with the problem of the relation between allergy and immunity. The tuberculous eye lesion of the kind discussed was probably caused by the flaring-up of a healed tuberculous lesion, the disintegration—through the acquired immunity—of the liberated bacillus, and the consequent action of the breakdown products on tissues which had become sensitized; for the patient, in addition to developing immunity, had also developed hypersensitiveness.

Sir STEWART DUKE-ELDER compared the type of lesion under discussion to that regarded as due to focal sepsis: pyaemia, like frank tuberculosis, rarely gave rise to eye lesions, and in the eye lesion in focal sepsis the incriminated organisms could not be isolated from the eye. The assumption of Löwenstein that there was a tubercle bacteriaemia in clinically healthy people found its parallel in the work of Okell and Elliot, who demonstrated a transient streptococcal bacteriaemia in dental sepsis. The problem therefore resolved itself to the question why a blood condition that was clinically innocuous should set up reactions confined to the eye. Of the two possible explanations—selective localization by the organisms or supersensibility of the eye—the second was the more acceptable, and was supported by much significant experimental work. Granted that the eye became sensitized during the course of general infections, and that transient bacteriaemia was not uncommon, many of the difficulties in obscure eye disease cleared up.

Dr. S. R. GLOYNE remarked that there were practically no post-mortem records as to the prevalence of eye disease as a complication of tuberculosis. The records in animals were only a little less meagre. He classified the lesions into five groups: (1) rare lesions suggesting the eye as a portal of entry; (2) those of haematogenous origin; (3) those following direct extension from the brain or meninges; (4) destructive disorganizing disease of the orbit; (5) lesions suggestive of allergy. He held that the majority were probably haematogenous in origin and fell into two groups: (1) those isolated lesions occurring early in the disease and tending to become quiescent under treatment; and (2) those which were part of a generalized miliary tuberculosis. It was one of the difficulties of tuberculosis pathology that one lesion might progress whilst another was regressing. Tuberculo-allergy in relation to obscure disease of the eye had also given rise to considerable difficulties, and he stressed the fact that in tuberculosis in general there were at least two different types of reaction—a local reaction round a collection of tubercle bacilli, and a local reaction apart from the collection of bacilli. Dealing with the high percentage of positive findings obtained by Löwenstein in his tubercle blood cultures from eye cases, he pointed out that there had been serious criticisms of the technique, and the method had given these positive results only in the hands of Löwenstein and his co-workers in Vienna.

Mr. JAMESON EVANS (Birmingham) confined his remarks to recurrent retinal haemorrhages in adolescents, dealing mainly with Eales's disease. He pointed out that the original cases of Eales's showed a clear-cut entity: all the patients were youths (14 to 20); all were troubled with constipation of varying severity; all had high arterial tension, but no renal disease; all had epistaxis; and in all but one case the left eye was affected. In Eales's cases the retinal vessels were tortuous and dis-

tended in both eyes and the haemorrhages were roundish and diffuse ; in only one case were they striate. Recurrences were common, and in no case was there any constitutional disease to account for the retinal lesion. The speaker was inclined to agree with Eales's original explanation that the haemorrhages were secondary to increased blood pressure owing to stimulation of the splanchnic nerves, with local alimentary canal symptoms and compensatory dilatation of the peripheral terminal vessels, leading to haemorrhages in the ill-supported capillaries of the nose and eyes. It was also possible that endocrine dysfunction associated with the developmental changes of puberty and adolescence, and perhaps also vitamin deficiency, were factors. Some cases were undoubtedly tuberculous or septic. The tuberculous cases were generally associated with latent tubercle, and the septic cases with apical dental infection. In such cases inflammatory reaction such as periphlebitis and choroiditis were likely, to be present and to be followed by proliferating changes in the retina and vitreous, leading to detached retina. He did not therefore consider such to be examples of Eales's disease, a designation which should be confined to the narrower group indicated by the original observer.

Dr. William Stobie (Oxford), discussing the question of diagnosis by tuberculin, said that the various skin tests might be misleading if ophthalmic surgeons laid overmuch stress on them. A focal reaction to old tuberculin was likely to be most helpful, and the danger associated with the test was exaggerated. He agreed that eye disorders in patients with open pulmonary tuberculosis were extremely uncommon, and that patients coming to the eye hospital with questionable tuberculous eye lesions appeared generally to be in good health. He suggested that *x*-ray photographs of the chest might be a useful addition to methods of diagnosis, and showed three slides with old lung lesions in patients whose eye condition was regarded by the President as probably tuberculous.

Mr. M. H. Whiting stressed the difficulties of the oculist in cases suspected to be tuberculous. In general medical and surgical tuberculosis the symptoms might be incompatible with another diagnosis, and positive evidence could be obtained clinically or post mortem. In ophthalmology the criteria were less conclusive. Speaking of tuberculous iritis he suggested the consideration of both negative and positive features in helping to establish a causal diagnosis. The negative features were those which eliminated other likely sources of the inflammation. The positive features were: (1) a characteristic persistence without remission, ending in recovery or in blindness ; (2) positive tuberculin tests ; (3) the presence of a tuberculous focus elsewhere. Dr. R. L. Vollum (Oxford) discussed the significance of Löwenstein's work on culturing tubercle bacilli from the blood. He thought that the methods employed were valuable ; the interpretations by Löwenstein and his co-workers were open to serious objection. Mr. Arnold Sorsby drew attention to the high incidence of positive tuberculin reactions in phlyctenular ophthalmia. His experience in White Oak Hospital, Swanley, showed that 70 per cent. of phlyctenular cases under the age of 6 gave positive reactions, and the chest findings, though inconclusive, were suggestive. Sir James Barrett (Melbourne) stressed the greatly diminished frequency of phlyctenular ophthalmia. In his view this was due to improved social conditions rather than to any therapeutic measures. Dr. Leonard Mitchell (Melbourne) advocated touching isolated phlyctens with a swab soaked in 2 per cent. silver nitrate. Attacks were thus cut short and much discomfort avoided. Lieut.-Col. E. W. O'G. Kirwan (Calcutta) said that ocular tuberculosis was uncommon in Bengal and Calcutta, although pulmonary tuberculosis was not infrequent. Phlyctenular keratitis was common, but responded well to treatment. Mr. James Craig (Belfast) referred to the effect of intercurrent disease in tuberculous eye lesions. He instanced a case of phlyctenular keratitis which resisted all treatment and then cleared up on the development of acute sinusitis with high pyrexia, and a case of uveitis improving during the course of erysipelas. Mr. G. T. Cashell (Reading) referred to the tuberculous nature of uveo-parotid fever, as proved in his case by a section from the parotid gland. He had found krysolgan useful. Dr. G. W. Harty (New Zealand) said that, although ocular tuberculosis was uncommon in New Zealand amongst the Maori people, he had met a form of tuberculous episcleritis which responded well to the oral administration of guaiacol carbonate (5 grains, in capsules, thrice daily). Mr. J. Gray Clegg (Manchester) described and illustrated the clinical course of a case of tuberculous iridocyclitis with massive granulation. Mr. D. V. Giri (Eastbourne) advocated the therapeutic use of tebeprotin as superior to other tuberculin derivatives. Dr. Anthony Palin (Edinburgh) said that at Edinburgh tebeprotin had been found useful when other tuberculin preparations had failed.

SECTION OF PATHOLOGY AND BACTERIOLOGY

Wednesday, July 22nd

Tuberculosis in Childhood and its Prophylaxis

With Professor E. W. Ainley Walker in the chair, a discussion on tuberculosis in infancy and childhood, with special reference to its prevention, was opened by Dr. J. W. S. Blacklock (Glasgow).

Dr. Blacklock, in an investigation of 434 cases with tuberculous lesions out of a series of 3,000 necropsies, found that the incidence was exceptionally low in the first three months of life, but thereafter gradually rose to a peak in the third year. He did not feel that the post-mortem index of infection was a true one in the higher age groups. To ascertain the incidence of infection in another way a series of Mantoux tests were carried out in nearly 2,000 children. These showed that in the first three years the percentage of positive reactions was below that of tuberculous lesions found at necropsy. The incidence of positive tuberculin reactions and positive post-mortem findings was much the same for the 3 to 6 year group, and thereafter the percentage of positive tuberculin tests rose to almost double that of the positive necropsy findings. This suggested a higher level of mortality during the first three years, followed by a resistance increasing with age.

Dr. Blacklock said that in late childhood minimal infections might result in some degree of immunity. He was not in favour of indiscriminate application of B.C.G. vaccine to the child population. On the other hand, the possibility of producing immunity with killed cultures should be considered. The tubercle bacilli gained access to the body through the respiratory tract in 65.2 per cent. of cases, and through the alimentary tract in 34.3 per cent. Of the cases of primary alimentary tuberculosis the portal of entry was the bowel in 32 per cent. and the pharynx in 2 per cent. Intestinal tuberculous ulcers with caseous mesenteric glands were found in twenty-four of the 140 abdominal cases, and in the remaining 116 no ulcers were observed but the mesenteric glands were tuberculous.

There was a higher incidence of tuberculosis in girls than in boys, and this might be due to the fact that in working-class homes they were more domesticated, and thus more frequently exposed to any familial infection. Prevention of alimentary infection depended on the milk being free from tubercle bacilli. Unfortunately infection with bovine bacillus accounted for a small proportion of the total tuberculosis mortality. The higher incidence of bovine infection in rural districts suggested a greater contamination of country than of town milk, and might be reduced by efficient pasteurization. The majority of infants were infected from adults with whom they were closely associated. The prevention of this continuous exposure was one of the most important measures in the control of infantile tuberculosis, and could only be brought about by isolating the infant from familial infection.

Dr. G. Lissant Cox (Preston) said that preventive work should be based on a sure pathological foundation. Research had shown that children exposed to risk in an infected household had a death rate greatly in excess of children living in other households. It had been found that the death rate from non-pulmonary tuberculosis of young children under 5 years exposed to risk was greatly

in excess of the rate from the same cause among children in Lancashire serving as "controls." Further, the mortality rate was greater in those exposed to infection from a tuberculous mother than in those exposed to infection from a tuberculous father. The four principles that could be adopted to safeguard the child from infection were indicated by the words isolation, immunization, environment, and education. In Lancashire the basic principle was: find, isolate, educate, and treat the adult positive case. This would safeguard the child. The percentage fall in the last twenty-one years in both the death rate and the case rate in pulmonary tuberculosis per 1,000 of the child population in the county of Lancaster had been over 80. Only a minority of tuberculosis workers in this country advocated inoculations for immunization, but further experiments should be made. The recent investigation into causal factors in tuberculosis on Tyneside, undertaken by Dr. F. C. S. Bradbury at the instance of the National Association for the Prevention of Tuberculosis, established the fact that overcrowding, under-nourishment, the occupation of tenement dwellings, and poverty definitely contributed to the prevalence of tuberculosis in the areas dealt with.

It would, Dr. Cox said in conclusion, be generally admitted that a better environment—a higher standard of living and of housing—would directly safeguard against infection, and the great diminution which already had occurred in the number of cases and deaths from tuberculosis was due in part to improvements in the well-being of the people.

Dr. R. L. VOLLUM (Oxford), discussing the experimental aspects of B.C.G., said that it had been used extensively for the immunization of cattle, without, however, any general agreement as to its effectiveness. There was no evidence of immunity being produced in guinea-pigs with B.C.G.; there was, however, evidence that it was produced in cattle. However, together with Dryer he had shown that it was possible to produce a fairly solid immunity in cattle with dead vaccine.

Dr. K. NEVILLE IRVINE (Henley) said that B.C.G. had been taken up in a fanatical rather than a scientific way in France. The most important question was: Is B.C.G. safe or is it not? A million and a half children had received B.C.G., and so far nothing untoward had happened. It was not yet known what was going to happen, as the oldest child vaccinated was 14. He thought that the B.C.G. died in about two years, and the immunity produced became gradually less. In present circumstances he advocated that where small children were exposed to infection in their homes they should be given B.C.G. vaccine. Dr. N. J. ENGLAND (Oxford) doubted whether isolation would be effective in prevention; he also doubted whether immunity by B.C.G. would achieve much in this direction.

Dr. J. V. DUHIG (Brisbane) thought that Australian experience might be of interest. The incidence of tuberculosis was falling in Australia, as it was generally in other countries, and he thought this general fall should be remembered in assessing the effect of improvement attributed to public health measures. In Queensland tuberculosis in children was almost always a meningitis, which was uniformly fatal. Glandular, bone, and joint tuberculosis was hardly ever seen. Respiratory tuberculosis must exist, since it was seen in adults at necropsy, but was not severe enough to produce serious or fatal disease. He believed that nutrition and climate played a most important part in the incidence of tuberculosis. In Queensland they had a wide, varied, and abundant dietary, and a dry, sunny climate. Professor W. CAMPBELL (Capetown) emphasized the importance of improving housing, of proper feeding, and of eliminating all factors of infection which might be attributed to poverty. He was against the use of B.C.G., and favoured a scheme of compulsory and controlled pasteurization of milk. The coloured people of the Cape showed an appalling incidence of tuberculosis, mostly of the human variety. This was probably due to the bad housing and general economic conditions. Dr. H. C. TROWELL (Uganda) said that in East Africa they could see what happened to a native population when tuberculosis was introduced. There, too, they had the advantage of practically no tuberculosis in cattle. Tuberculosis now assumed the second most important cause of death, and it corresponded to the infantile type of tuberculosis as seen in this country. Dr. EDWARD DOVEY (Hong-Kong) raised the question of acidity and alkalinity. He thought that the biochemists should co-operate with the bacteriologists.

Prophylaxis of Pneumonia

Professor LLOYD D. FELTON (Boston, U.S.A.) described an experiment in the production of prophylaxis of pneumonia. He thought the ideal would be to find a substance which would produce a non-specific immunity—that is to say, an immunity to all the different types of pneumococcus. He stated that a polysaccharide substance had been isolated which had given results which suggested that such an immunity might eventually be achieved.

Dr. G. L. MONTGOMERY (Dundee) read a paper on the urea clearance test of van Slyke.

SECTION OF ANATOMY

Wednesday, July 22nd

Scope of Teaching and Research in Anatomy

Professor W. E. LE GROS CLARK (Oxford), the President of the Section and chairman of the meeting, opened the proceedings with a discussion of the scope of teaching and research in anatomy. Anatomy, he said, was the science of form and structure, and its scope was the investigation not only of structure as revealed by direct observation, but also of all factors which might be concerned in the development and maintenance of the parts of the body. The experimental method was essential in the elucidation of anatomical problems, but though its development was partly stimulated by early anatomical workers in this country, it was for a long period discarded by English anatomists as a weapon of research. Experimental techniques in the hands of physiologists had provided a rich harvest of anatomical as well as of physiological facts, and anatomists in consequence had to thank physiologists for much of their fundamental anatomical knowledge of the nervous system. The traditional bias against using the experimental method in anatomy had been breaking down in recent years, and English anatomy might now look forward to a phase of development no less full of promise than that which had been realized with the method by American anatomists. Professor Le Gros Clark pleaded for the simplification of the teaching of anatomy by relieving the student of the necessity of memorizing details of topographical anatomy that were of little practical importance. He also pressed for recognition of the fact that the rightful place of histology was within the field of anatomy, and he pointed out the value of a "functional" outlook in morphological teaching.

Problems of Experimental Embryology

Mr. C. H. WADDINGTON (Cambridge), who followed, dealt with problems of experimental embryology. The refutation by modern biology of Victorian ideas of embryonic recapitulation, and the consequent failure of comparative morphology to provide any explanatory concepts for embryology, had placed the latter on its feet as a definite field of inquiry. Beginning with Spemann in 1918, a dynamic view of ontogeny had been developed, and had eclipsed in importance the older descriptive embryology. Experiment had revealed the fundamental importance of organization centres and organizing substances in the reactions of the developing organism. It had also indicated the significance which had to be attached both to the competence of embryonic tissues to react to the organizing stimulus, and to the integrated manner of their responses. Mr. Waddington illustrated his paper with examples from his work on the cross-transplantation of organizing centres from chicks to rabbits. He also showed two films on the development of the newt and chick respectively.

Anatomy of Peripheral Sensation

Professor H. H. Woollard began a paper on the anatomy of peripheral sensation with a reference to the strong stimulus anatomy received from its close association with medical teaching, and he also paid tribute to the influence Sir Grafton Elliot Smith had had in the development of the newer and more vigorous outlook of English anatomy. Professor Woollard then gave an account of his recent investigations of the histological background of the punctate theory of cutaneous sensibility. Maps were made of the nerve endings in defined areas of skin, which were then shaved in successive layers, each of which was examined histologically. A fundamental finding was that one nerve fibre bore only one kind of nerve ending. The deeper layers of the epidermis were supplied with some nerve fibres, frequently ending in Merkel's corpuscles, which were associated with touch. Pain was subserved by a subepidermal meshwork of naked, varicose, fine nerve fibres. The sensation of cold was received by compact terminal expansions of small medullated fibres.

Structural and Functional Homologies of the Reproductive System

A paper by Dr. S. Zuckerman (Oxford) on structural and functional homologies of the male and female reproductive systems completed the morning's programme. Recent work on the differentiation of the gonads was reviewed, and the development of Wolffian and Müllerian ducts considered in relation to various views on the influence played by the sex hormones in the process. Dr. Zuckerman then considered the specificity of the sex hormones. The gonadotropic hormones of the pituitary gland affected males and females equally, and the male gonadal hormone, testosterone, was effective on the female reproductive organs. Oestrogenic hormones again had numerous effects on the male. So far as sex hormone antagonism was concerned, Moore's views, which had been current until recently, would have to be revised in view of these recent findings on the effects of the gonadal hormones of one sex on the reproductive organs of the other, and of the findings on peripheral antagonism of the sex hormones when in the blood stream.

SECTION OF DISEASES OF CHILDREN

Wednesday, July 22nd

Obesity in Children

With Dr. R. C. Jewesbury, President of the Section, in the chair, a discussion was held on obesity in children.

Dr. H. Gardiner-Hill, in opening, emphasized the importance of early recognition and prevention of obese tendencies in childhood so as to avoid the troubles occasioned by this state in adult life. It was often difficult, he said, to convince the lay public of the importance of food intake and energy output in the production of obesity, and what was termed "allowing Nature to take its course" often meant non-interference with a clearly abnormal appetite. It was difficult to draw a sharp line between the so-called simple type of obesity and that associated with definite endocrine disorder. Great restriction in activity, as, for example, in children with heart disease, might lead to obesity in its simplest form, but even with such a history it was notable that the onset often coincided with the early stages of puberty. While obesity certainly occurred in a number of endocrine syndromes, it was not at all frequent in its severe forms in recognized states of endocrine deficiency. Gross obesity was by no means the rule in pituitary defects, for example; and Fröhlich's syndrome was too often diagnosed when there was no real defect in sex development or growth. As regards other factors, the psychological aspects of appetite and the impulse to activity or repose had to be considered, in connexion with hereditary influences and possibly endocrine alterations. Evidence suggested that obese children presented an abnormal capacity for storage, possibly associated with some part played by insulin, and that water–salt storage was a factor in some types of obesity. Here again endocrine control was probably the essential feature, and it would eventually explain why the obese child stored all excess of energy intake over output.

Dr. P. C. Mallam (Oxford) thought obesity was due to a general breakdown of the metabolic process rather than to a special defect on the anabolic side. It could be stated that obesity was always due to excessive intake, that the amount of such excess necessary to produce obesity depended upon the degree of breakdown of the metabolic mechanism, and there was always some water and salt retention as well as storage of fat. It was a real unkindness to leave fat children without help. In contrast to adults, fat children were usually willing and anxious to co-operate in treatment, and it was essential for success to obtain definite assurances from parents that they also would co-operate fully. The first steps in treatment should be dietetic restrictions pure and simple. Not only must fat and carbohydrates be restricted, but it was very important to limit the daily intake of fluids. Diuretic drugs might also be valuable in getting rid of excess of fluid in the body tissues. Obese children, Dr. Mallam said, often ate far too quickly, and overshot the point at which appetite had really been appeased. Thyroid and prolan would certainly help to control weight, but it was probably unwise to administer substances known to upset the metabolic balance when this was already disturbed by unknown factors. He thought that success was obtained when a child's weight could be kept stationary, and this should be aimed at rather than great decreases in a growing organism.

Dr. R. W. B. Ellis said that obesity for practical purposes might be classified as (1) simple, and (2) the result of gross endocrine disturbance—for example, tumour or atrophy. The simple cases could be further subdivided into those in which exogenous factors (food intake, lack of exercise) appeared of primary importance, and those in which endogenous or personal idiosyncrasies exerted most influence. Of these, he continued, indication might be given by family history and age of onset—for example, puberty. In every case, however, both endogenous and exogenous factors must be to some extent operative. In fifty consecutive cases he had investigated with Dr. K. H. Tallerman no evidence was found of gross endocrine disturbance, and none approximated to the Fröhlich type. Sexual development had begun in the thirty-one which could be followed to the age of 14. The deposition of fat was generalized, but tended to be most marked over the breasts and lower abdomen in both endogenous and exogenous cases. The blood pressure was often considerably raised. The endogenous cases showed, on the whole, an increase of carbohydrate tolerance as compared with the exogenous. Many of the cases suffered from some degree of genu valgum. A question as to the universal advisability of treatment was raised. The problem differed from that of obesity in the adult, since it was important not to starve the growing child of carbohydrate, and also undesirable to give a healthy child a sense of invalidism. It was wise to aim at allowing the child to grow up to its weight—that is, to keep the weight stationary rather than to cause a rapid fall in weight. Thyroid should be kept for those cases in which there was any evidence of hypothyroidism, and pituitary extracts for those very rare cases in which there were confirmatory signs (such as lack of growth, true hypogenitalism, delayed ossification, polyuria, or polydipsia) of pituitary dysfunction.

The President said that in out-patient work the common type of fat child was alert, overgrown, and full of activity, not suggesting that lack of exercise played any important part in the production of the condition. He agreed that it was best to wait until puberty was past before giving radical treatment, as, for example, by thyroid gland extracts. In infants excessive fatness was becoming less common than previously, but he occasionally met examples in breast-fed babies often actually having a quantity of breast milk which was theoretically inadequate. Dr. E. P. Poulton said that there was a simple relation between metabolism and body weight, and since a sudden increase in height occurred after the

end of the first year, together with increased exercise, there was often a definite falling-off in fatness after this period. It might well be that fluid retention rather than fat retention accounted for cases of children with an increase in body weight associated with a lessened metabolism, and such "watery" children might be treated with thyroid gland. He thought it unwise to restrict fluid intake in children, as it caused great discomfort. Restriction of fat was likely to be more popular than restriction of carbohydrate. Dr. S. P. HUGGINS (High Wycombe) mentioned cases of obesity which followed septic infections. As medical officer to a girls' school he was struck by the way in which girls who had been abnormally fat at school returned in their early twenties to reunions perfectly normal and slim. In his experience school authorities were not worried about obesity. Dr. P. M. F. BISHOP, speaking about pituitary preparations, stated that there were none on the market with any proved effect upon obesity, and no pituitary preparation was of the slightest use when given by the mouth.

Blood Transfusion

Mr. DENIS BROWNE, opening a discussion on the indications for and the value of blood transfusion in childhood, said that this procedure had rapidly reached a stage where it appeared destined to remain for some time with no change in principle or widening of the field for application. While this was satisfactory, he continued, it was probably true to say that only about 10 per cent. of those who would be benefited by a transfusion received one. An ideal organization would cover the whole country, so that specially trained men, constantly performing transfusions, would be available everywhere. Every individual, said Mr. Browne, should know his own blood group, and the methods used for transfusion should be uniformly standardized as regards technique and the best apparatus to be used. Direct transfusion was inadvisable because of the speed of flow required. The citrate method was best, and the blood must be put in as slowly as for a correspondingly larger amount in an adult. The propelling force for the blood was a matter of some importance in view of the small calibre of a child's veins, and, since the measure was necessarily urgent, it was essential that at a pinch it could be carried through without any assistance.

Dr. ALAN KEKWICK, in presenting a paper by himself and Dr. H. L. MARRIOTT, dealt with drip transfusions. The two fundamental principles involved in this method, he said, were concerned with the dose of blood and the rate of its administration. The dose should be determined by the degree of anaemia present, and the ideal to be achieved was to raise the haemoglobin to a normal percentage. A pint of blood in an adult would raise the haemoglobin by about 10 per cent., and hence in very anaemic subjects large amounts were indicated, and could only be given by the drip method at a rate not exceeding one pint every four hours. In children it was assumed that the total blood was one-eleventh of the normal body weight, and the administration of one-tenth of the calculated blood volume raised the haemoglobin by 10 per cent. The rate of transfusion in children had to be slightly quicker than in adults, but modifications in the apparatus used were being tested to avoid this if possible. In a small baby two drops per minute was probably the ideal rate.

Mr. R. H. ROSE-INNES (Oxford) spoke of the difficulty of obtaining donors for blood transfusion. An excellent donor service existed in Oxford, but it was not sufficiently known, and only too often the volunteers were working men instead of young women with leisure to recuperate. In searching for donors he sometimes made use of patients with high blood pressure, for whom a venesection did good. In regard to details of technique, the speaker said that he had discarded the anterior fontanelle as a route, and used instead the great saphenous vein in the leg. Infants were restrained on a small padded crucifix, and the blood must be carefully warmed. He had used blood transfusions for certain acute infective conditions, but it was essential in such cases to run the blood in very slowly.

The PRESIDENT spoke of the difficulties encountered in the transfusion of very small wasted infants. Even experienced surgeons could not easily get into a vein in such subjects. He thought that blood transfusion demanded a very special training. Dr. C. F. HARRIS thought that there was a real danger of blood transfusion being regarded as a panacea for almost anything. He did not agree that the indications for its use were by any means settled. It might be useful in certain toxic states, but it did not always appear to do good. More information was needed on results obtained. Direct matching was essential when infants were given blood.

SECTION OF OTO-RHINO-LARYNGOLOGY

Wednesday, July 22nd

Acute Streptococcal Infection of the Ear and Nasopharynx

With Mr. LIONEL COLLEDGE, the President, in the chair, Mr. W. M. MOLLISON opened a discussion on streptococcal infections of the middle ear and nasopharynx.

After discussing the possible routes of infection of the middle ear, Mr. Mollison said that in the summer, bathing in fresh-water baths was the common cause of acute otitis media. He then dealt with prophylaxis and treatment. Although Mr. Mollison concurred in the modern view concerning expectant treatment, he still favoured paracentesis in cases of a red, bulging drum associated with pain and pyrexia. Many cases of apparently mild otitis media subsided under expectant treatment so far as the acute inflammation was concerned, but seeds of deafness were sown the results of which only became evident some years later. The speaker drew attention to the great advance in the treatment of severe infection effected by blood transfusion and injections of pentnucleotide.

Mr. E. D. D. DAVIS said that streptococcal infections of the pharynx and larynx could be divided into two chief degrees of inflammation: tonsillitis of varying degrees of severity, and gangrenous cellulitis with septicaemic symptoms. There were many cases between these two extreme types. Although the causal organism was usually the haemolytic streptococcus, the pneumococcus was sometimes responsible, and the infections ran a similar course. It appeared, he said, to be universally accepted that anti-scarlatina streptococcal serum should be given in large doses.

Dr. H. T. GILLETT (Oxford) recommended that autogenous vaccines should be given to patients with mastoid infection. He insisted that the best results were obtained with freshly prepared cultures.

Sir STCLAIR THOMSON called attention to the peculiar fact that acute streptococcal infection seemed to have its maximum effect on people who appeared to be in robust health, and that the apparent weaklings were often only mildly affected. His experience had shown that cases which had to be tracheotomized nearly always proved fatal. Although he did not agree with massive douching of the nose, he believed in cleansing the nose by spraying and sniffing. He warned practitioners against assessing the severity of the infection from laboratory reports, and urged them to rely particularly on the appearance of the patient. He also warned them against the use of powerful hypnotics in cases of upper respiratory tract infections. Dr. JAMES ADAMS (Glasgow) thought infection by the pneumococcus was often more severe than infection by the streptococcus. Mr. M. VLASTO endorsed the views expressed by the openers that bathing was a frequent cause of infection of the throat and ear; whether this was due to a diminution of the bactericidal effect of the mucus or to direct infection he could not say. Dr. F. E. CAMPS (Chelmsford) demonstrated charts showing infection with the streptococcus in a children's hospital ward, and how reinfection was brought about by different types of streptococcus. These were cases of infectious disease, and should be isolated whether sore throats were present or not. The variations in the clinical types might be due to different infections. Dr.

RICHARD FRANCIS (Sydney) called attention to the dangerous, silent type of infection by the *Streptococcus mucosus*. He recommended that emergency tracheotomy should be carried out in bed. The fact that the patient could be propped up with pillows behind him rendered the operation less distressing to the patient and easier for the surgeon. Dr. LÜSCHER (Berne) said that the Swiss were not in favour of tonsillectomy in the acute stage, but that apart from the difficulty of the operation no bad results had been noted. Prontosil had been extensively used in Switzerland, but the results had not been conclusive. He thought that the use of the drug in the earlier stages might show better results. Mr. E. WATSON-WILLIAMS (Bristol) thought that to increase the spacing between the beds in a ward was a useful measure in limiting the spread of infection in these cases.

Inflammatory Tumours of the True Vocal Cords

Dr. GABRIEL TUCKER (Philadelphia) then read a paper on inflammatory tumours of the true vocal cords, illustrating his remarks with lantern slides. He stated that chronic inflammatory tumours of the true vocal cord tended to increase in size because of the functional activity of the cords. A vicious circle was set up, but this could be dealt with and the normal contour of the cord restored by direct laryngoscopic removal of the tumour, followed by voice training to restore the musculature to normal. Microscopical examination of tissue removed by direct laryngoscopy provided a histological basis for diagnosis. He showed films to demonstrate his methods. Dr. V. L. PARMAR (Bombay) showed films illustrating the removal of tonsils by diathermy and by dissection.

SECTION OF RADIOLOGY

Wednesday, July 22nd

Pathological Changes in Bones and Joints Induced by Injury

The President, Dr. R. H. SANKEY, occupied the chair, and the proceedings opened with a paper by Dr. J. F. BRAILSFORD (Birmingham) on pathological changes in bones and joints induced by injury.

After stressing the importance of taking radiographs in two planes when dealing with fractures, Dr. Brailsford drew attention to the value of serial radiographs at monthly intervals after the injury as giving valuable information concerning the progress of union. Sometimes, although much callus was formed, the gap between the bones was not bridged, and a false joint might result. In successful bone grafting, the graft assumed the normal appearance of the bone concerned. In unsuccessful cases the graft might be absorbed, or might retain its calcium, such a graft being ultimately discharged through a sinus, or having to be removed. In compound fractures serial radiographs enabled the observer to distinguish between sequestra and living fragments. Kümmell's disease—a non-tuberculous rarefying osteitis—was probably caused by spinal trauma unrecognized at the time of injury. Damage to the cancellous tissue could not be demonstrated radiographically at the time of injury, but collapse of the vertebral bodies occurred later. Similar changes took place after injury to the carpal scaphoid and the acetabular wall.

Wires and plates used in the treatment of fractures resulted in chronic inflammation, causing increased plasticity and bending of the bone even years after operation. They should therefore be removed as soon as their purpose was served. Some cases of rarefying osteitis which had hitherto been regarded as tuberculous were probably traumatic in origin. Ossification in haematomata near the site of fracture was apt to be misleading, and sarcoma of the bone had occasionally been diagnosed. Trauma might cause injury to cancellous tissue, giving rise to a cyst-like appearance, the commonest site being the carpal scaphoid. Diminution in the joint space might result from injury, and might be an early stage of the changes commonly recognized in osteo-arthritis. Dislocation and subluxation might be followed by secondary changes in the bone, and the trauma inseparable from manipulation was also responsible for such changes. After immobilization of a limb osteoporosis might develop, affecting particularly the cancellous extremities of long bones and of the bones of the foot and hand. The condition usually cleared up on subsequent normal use of the limb, but might become progressive, giving rise to what was sometimes called "acute bone atrophy." The radiographic appearances were often difficult to interpret, and diagnoses of tuberculous disease and of sarcoma had sometimes been made.

There was experimental evidence in animals that bone abscess followed trauma to bone if pathogenic organisms were circulating in the blood, and this was confirmed by the occurrence of septic abscess, tuberculosis, or gumma of the bone after trauma in patients who had septic, tuberculous, or syphilitic lesions elsewhere. The connexion between trauma and malignant disease of the bone was ill-defined, but there was little doubt that injury played some part in the aetiology, and this was supported by Ségond, Coley, and Ewing.

Dr. GILBERT SCOTT (London) doubted whether trauma alone produced such changes as Dr. Brailsford had suggested; there must be some other factor. It was important to discover whether the injury concerned had been the actual cause of subsequent bone changes, whether it had aggravated pre-existing disease, or whether it had led to the discovery of a lesion which was already present. Dr. Brailsford had quoted no fewer than thirty conditions as being caused by trauma, but he felt that the mere fact that trauma had occurred before the disease was recognized was not sufficient evidence that it was the cause. Protrusio acetabuli—which in Dr. Brailsford's opinion was traumatic in origin—was often inherent.

Mr. S. A. S. MALKIN (Nottingham) did not agree that injury resulted in subsequent tuberculous disease. Bony changes in the femoral neck after the reduction of congenital dislocation of the hip were not due to manipulation but to natural malformation. Dr. J. DUNCAN WHITE, speaking of congenital dislocation, said that he had seen osteo-arthritis in hips which had been reduced, but never in those which had been left alone. He did not agree with Dr. Gilbert Scott that protrusio acetabuli was a congenital condition, and quoted cases in support of this. Dr. G. B. BATTEN cited the case of an athlete whose fractured tibia had been wired twenty-four years ago and who had had no trouble since. He believed, however, that plates should always be removed.

Dr. BRAILSFORD, in reply, denied that he had adduced trauma as the cause of these bone diseases. He thought, however, that trauma appeared to play some part in causation. There were many cases of well-defined bone lesions in which previous injury was too recent and too prominent to be ignored as a cause. He did not agree that protrusio acetabuli was congenital, and maintained that arthritic changes followed manipulative reduction of congenital dislocation of the hip.

Bronchiectasis in Children

Dr. C. G. TEALL (Birmingham), in a paper on the radiological aspect of bronchiectasis in children, said that bronchiectasis was often the result of bronchopneumonia following measles or whooping-cough, or after sinus infection, and was more common than was usually recognized. The radiographic appearances were due to cavity formation and coexistent fibrosis. He used a degree of penetration proportionately greater than in adults; without this exact work was impossible. There were two distinct methods of examination: direct examination, and examination after lipiodol injection. The appearances on direct examination were largely due to fibrosis of the lung, so that early cases might show no abnormality. As early diagnosis was all-important in this condition, he had come to the conclusion that direct examination in the early stages was of no value. The study of the radiographs of 250 cases of suspected bronchiectasis examined by the direct method confirmed this.

Since the introduction of lipiodol diagnosis had become more reliable, and could be made earlier. The technique varied, but in older children the simplest method was

injection through the crico-thyroid membrane. In infants the best method was injection by means of a catheter passed, under general anaesthesia, through the larynx. In early cases cylindrical or fusiform dilatation of the bronchi was seen, and fluid levels might be demonstrated. Later, sacculation developed, and sometimes an intermediate stage—varicose bronchiectasis—could be defined. Lipiodol showed the nature of a certain type of basal shadow, hitherto thought to be due to mediastinal effusion. Such shadows occurred at the base of the lung, and were evidence of bronchiectasis in a collapsed lower lobe. Congenital bronchiectasis, which had hitherto been regarded as a rare condition, was fairly common. The disease was probably due to a developmental error, and radiographs showed a honeycomb appearance without associated fibrosis. Treatment by bronchoscopic suction was beginning to give good results, but it was important that all cases suspected of bronchiectasis should be investigated by lipiodol in order to make the diagnosis as early as possible.

Dr. C. HILLIARD said that the use of lipiodol had changed our conception of bronchiectasis. He showed several radiographs illustrating the results of lobectomy in this condition. Dr. J. DUNCAN WHITE said that although lipiodol could remain in the tissues for long periods without ill effect, he thought it wise to examine radiographically the stomachs of children who had had lipiodol injected into the trachea. If there was much lipiodol present he washed the stomach out to obviate iodism. Dr. BRAILSFORD emphasized the importance of careful investigation of both sides of the chest, especially in those cases in which surgery was contemplated.

Dr. TEALL, in reply, said that he was interested to see Dr. Hilliard's films illustrating the results of lobectomy. He had only seen one case in which the operation was thought possible. He did not wash out the stomachs of children after lipiodol injection, and had never yet had a case of iodism. The youngest age at which he had encountered bronchiectasis was 15 months. Dr. RUSSELL REYNOLDS showed many cineradiographic films illustrating bronchiectasis and pneumothorax.

SECTION OF PUBLIC MEDICINE

Wednesday, July 22nd

The Haemolytic Streptococcus

With Dr. W. M. WILLOUGHBY, the President, in the chair, Dr. DUNSTAN BREWER (Swindon) opened the discussion on the haemolytic streptococcus, with special reference to scarlet fever.

Dr. Brewer said that diseases caused by the streptococcus fell into two groups: (1) the three notifiable diseases—scarlet fever, erysipelas, and puerperal fever; (2) a widespread miscellaneous group. With the human nasopharynx as the streptococcal reservoir it was necessary to combat the spread of infection by the use of masks in surgery and midwifery, by the relative isolation of sources of infection, and by adequate spacing of the sick. With regard to the interaction of scarlet fever and the puerperium, while implantation at the normal site, the nose or throat, resulted in both scarlet fever and the puerperium following their normal course, implantation in the genital canal produced serious effects. In the latter case the potential resistance, inherent in the nose and throat, was lacking, and any trauma during delivery facilitated a direct entry of organisms into the blood stream. By contrast, surgical scarlet fever due to implantation of streptococci on wounds or burns was usually trivial. Scarlet fever was the most frequent, but the least serious, of streptococcal infections, its mortality rate having decreased sensationally in recent years. There was evidence that a definite attack of scarlet fever gave at any rate some protection against subsequent streptococcal invasion. With regard to the connexion between scarlet fever and so-called acute rheumatism, future research would probably demonstrate that the same strains of haemolytic streptococci were responsible for both conditions. The use of serum conferred immunity against the toxaemia of scarlet fever, but there was no evidence of protection against streptococcal invasion and septicaemia. The difficulty lay in the local character of streptococcal immunization.

Dr. B. A. I. PETERS (Bristol) predicted an increase in the severity of scarlet fever. In Bristol the incidence had risen, mastoid complications with extensive bony damage were frequent, and nephritis had occurred in 3 per cent. of cases, with three deaths. This more severe type, which often recurred within three months, did not show rheumatic and endocardial complications. Since 1934 nine of the staff had contracted scarlet fever, despite immunization, and everything pointed to a more severe strain of infection. Drug treatment, though somewhat empirical at present, held hopes for the future, and treatment with the complex substances S.U.P. 36 and S.U.P. 468 was producing good results. It was highly important that municipal authorities should allocate adequate funds for purposes of research.

Dr. H. J. PARISH (Beckenham) regarded the Dick test as a most sensitive indicator of immunity to scarlet fever; but this did not apply to puerperal infection. As he showed by statistical tables on the screen, inoculation reduced severity, complications, and death rate. In other streptococcal infections, however, it was of little benefit and might do harm. Immunization caused a marked diminution in the percentage of cases. The production of anti-bacterial sera from animals presented difficulties on account of the variety of strains. Dr. J. D. ROLLESTON stressed the importance of otitis as a complication of scarlet fever, and stated that in the London area scarlet fever was generally of a mild type at present. Dr. D. S. SUTHERLAND (Manchester) said he had found that an increase in the incidence of scarlet fever was accompanied by a corresponding increase in erysipelas and puerperal sepsis. Possibly in the future scarlet fever would be treated in general hospitals, resulting in an advantageous collaboration between the clinical and scientific staffs.

Dr. BREWER, replying, stated that the severer type of infection noted in Bristol was spreading east, and had reached Swindon and Oxford. The streptococcus was liable to enormous variation in virulence, with a tendency to revert to a non-pathogenic type. He reiterated his hopeful outlook for the future and the necessity for research.

Shellfish and the Public Health

Dr. R. W. DODGSON, Director of Shellfish Services, Ministry of Agriculture and Fisheries, read a paper on shellfish and the public health, which was printed last week at page 169. Dr. Dodgson's paper was followed by an excellent film, showing the methods of mussel collection and purification at Conway. Dr. H. P. NEWSHOLME (Birmingham) regarded the question from the point of view of an inland authority obliged to safeguard the health of consumers in its area. Naked-eye inspection was useless for shellfish. In bacteriological examination standards of *B. coli* infection had to be taken from the number per c.cm. in an oyster, owing to variations in size. In the case of any epidemic there was a long time lag before delivery of suspected shellfish could be stopped. Mutual unofficial collaboration between inland and coastal authorities was often satisfactory. In 1933 two cases of typhoid, with one death, were traced to mussels, and it was found that the so-called purification bed was exposed to three main sewers. Birmingham had since obtained parliamentary powers to prohibit the sale of shellfish from certain districts, if a danger to public health. Coastal authorities might well combine into groups for the purposes of properly controlled purification.

Dr. C. BANKS (Nottingham) expressed his dissatisfaction with the mussel trade, having encountered cases of typhoid caused by mussels in three different towns. All mussels ought to be treated by the Conway scheme, and traders would be wise to collaborate with sanitarians. Legislation was required to make it illegal to sell mussels not thoroughly purified, and he suggested that the meeting should pass a resolution to this effect. Professor J. W. BIGGER (Dublin) regarded the presence of acid and gas as the red light of danger, and their appearance within twenty-four hours should be taken as an indication of faecal pollution. It was advisable to err on the side of

caution, and it was an urgent necessity that shellfish should not be sold unless carefully controlled and bacteriologically examined. Dr. C. F. WHITE (Port of London Sanitary Authority) described the cheapness, simplicity, and compactness of the oyster purification plant at Brightlingsea. He proposed the following resolution:

> The time has now arrived when the Ministry of Health should be requested to make regulations prohibiting the sale for human consumption in this country of molluscan shellfish, whether home-produced or imported, which are not certified to have been cleansed by a recognized method at a station approved for the purpose by the Minister of Health.

Dr. BANKS seconded this resolution, which was carried *nem. con.* Dr. J. D. ROLLESTON spoke of the high incidence of typhoid from oysters in France, where drinking wine was thought to have some prophylactic effect.

Dr. DODGSON, in reply, confirmed Dr. Rolleston's remarks, stating that the deaths from typhoid in Marseilles numbered 700 per annum. With regard to legislation the Ministry of Health had already considerable powers, but there were many difficulties to overcome before achieving the goal of universal purification.

SECTION OF NUTRITION

Wednesday, July 22nd

Nutrition in Health and Disease

With the President, Dr. ARTHUR F. HURST (Ascot), in the chair, Sir ROBERT MCCARRISON (Oxford) opened a discussion on nutrition in health and disease.

Sir Robert McCarrison said it was becoming apparent that the science of nutrition was the foundation of a more rational medicine. Food was the instrument of nourishment; nutrition was the act of using it; but only within recent years had the important relations of certain food essentials received due attention. So far as was at present known the foodstuffs which, when properly combined in the diet, ensured perfect nutrition were: a good cereal preparation, milk and the products of milk, eggs, green-leaf vegetables, root vegetables, legumes, fruit, meat, and water. The condition of the gastro-intestinal tract was dependent on the adequate provision in the diet of water, proteins, mineral elements, and vitamins. Vitamins of the A, B, and C classes had all a profound relation to the structural and functional efficiency of the alimentary tract, particularly in respect of such conditions as gastric dilatation, gastritis, peptic ulcer, enteritis, and colitis. Food deficiencies also deranged both the normal production of hormones and the functional perfection of sympathetic nervous control, and the effect of such deficiencies upon pregnant and nursing women indicated the necessity for proper feeding in these circumstances. The connexion between nutrition and intelligence and backwardness in school children afforded examples of the importance of nutrition in psychological medicine. Malnourished, weakly, and ill-nourished children were peculiarly susceptible to inflammatory states of the nose, ear, and throat, and there was a definite relation between faulty nutrition and respiratory diseases in general. Sir Robert McCarrison added that malnutrition was not necessarily dependent upon poverty, and he believed that it could exist in the midst of plenty. Education of both the public and the medical profession was necessary. The student should be taught less about "disease" and drugs and more about "health" and nutrition, which was the basis of health.

The Vitamins

Professor R. A. PETERS (Oxford) said that investigation had shown that vitamin B complex probably comprised at least six different entities, of which vitamin B_1 and lactoflavine had been obtained in a pure form. Differences in apparently similar foodstuffs might exist by reason of variations in the influence of soil and temperature upon growth and of the differing diets of farm animals. Individual dietary idiosyncrasies might be responsible for variations in effects observed in different persons. Vitamin B_1 was an essential catalyst in the oxidation of pyruvic acid. In conditions of B_1 deficiency pyruvic acid accumulated in the blood. Further, this vitamin could be shown, *in vitro*, to have a specific catalytic effect upon the brain tissue of pigeons suffering from B_1 deficiency. There was now clinical support for the statement that we should look for the use of vitamin B_1 in conditions of loss of appetite, oedema, palpitation and breathlessness, especially where there was defective removal of blood lactic acid after exercise, and neuritic conditions. To obtain proper effect, crystalline vitamin B_1 should be injected in amounts of 500 units a day up to a total dose of about 2,500 units.

Professor H. N. H. GREEN (Sheffield), discussing the fat-soluble vitamins, stated that the fixing of precise standards for vitamins A and D had been of great value to the physician. Cod-liver oil still retained its predominance in prophylaxis and treatment, and calciferol was only necessary in florid rickets and for premature children. The susceptibility of vitamin A deficient animals to septic lesions was generally ascribed to a fall in local resistance as a result of epithelial metaplasia. Some evidence had been obtained, however, that a slight fall in general resistance occurred in an early stage of deficiency of this vitamin. Vitamin A deficiency was not uncommon in tropical regions, and there was some evidence that epidemics of meningococcal meningitis were also associated with a similar deficiency. The liver reserves of this vitamin in many women dying in the puerperium were found to be low when judged by normal standards, and this indicated the need for a plentiful supply of vitamin A during pregnancy.

Dr. S. S. ZILVA criticized the view that the blood was capable of converting ascorbic acid to, and storing it as, the reversibly oxidized form of vitamin C. The tendency of the body was to reduce dehydro-ascorbic acid, and to protect the reduced form from oxidation; the vitamin was concentrated as ascorbic acid in certain selective tissues, including the eye. No cataract could be observed when the eye of the guinea-pig was depleted of vitamin C, notwithstanding assertions to the contrary. Dr. Zilva said it was now established that the Jensen rat sarcoma possessed the capacity of selectively concentrating the vitamin, and this fact suggested that probably similar concentration occurred in human malignant tissue, provided an adequate amount of ascorbic acid was supplied in the food. The quantity of ascorbic acid excreted in the urine by human subjects depended on both the amount present in the body and the quantity consumed. A more or less constant level of excretion could be obtained when the subject was "saturated" with respect to vitamin C, and a wide margin of "unsaturation" could exist which so far had not been shown to be associated with any pathological condition. Experimental work suggested that accumulated ascorbic acid did not act as a store in the true sense of the word.

Minerals in Nutrition

Dr. DONALD HUNTER enumerated the principal minerals necessary for adequate nutrition. Sodium had recently assumed importance in therapeutics. In the treatment of oedema it was withdrawn from, and in heat cramps it was increased in, the body. The urine of a miner with such cramps contained no chloride and the blood chloride was increased. Dehydration occurred in many clinical states, and it must be regarded as a loss of body fluid as distinct from a loss of body water; the administration of plain water to a dehydrated person could be dangerous. In Addison's disease, however, there was loss of sodium from the body without proportionate loss of water. Manganese was essential for the reproductive function in animals. There need be no fear of copper deficiency; in any case it was a natural impurity of the medicinal salts of iron. Calcium was removed from the soil by plants, and the green parts were especially rich in this mineral. Its most obvious bodily function was the formation of bone; the skeleton acted as the only reservoir of calcium in the animal body. Man probably required one gram of calcium a day, and was dependent mainly upon an intake of milk, cheese, butter, fish, and green vegetables. A high calcium diet was essential for pregnant and lactating women. Phosphorus was essential for life; in certain

parts of the world, however, the soil was grossly deficient in this element, and, in cattle, this led to a pathological craving for bones. At the most the daily iodine requirement of the adult was 0.05 mg., and deficiency in certain parts of the world led to the prevalence of endemic goitre. An inverse relation existed between the goitre rate in an endemic area and the quantity of iodine in the diet. The addition of five parts per million of potassium iodide to table salt had proved highly successful in the prophylaxis of goitre in these circumstances.

Nutritional Anaemias

Dr. LUCY WILLS said that a review of the subject of nutritional anaemia must begin with a consideration of the factors necessary for the maturation of the circulating blood from the primitive haemocytoblast of the bone marrow. Iron was only one of the factors that were an essential part of the red cell, the other factors for maturation being possibly hormone-like in their actions. The common nutritional anaemia in this country was an iron-deficiency state, occurring particularly as the nutritional anaemia of infancy, idiopathic microcytic anaemia, and the simple iron-deficiency anaemia of the adult. These were mainly due to a low iron intake, and women were more vulnerable subjects by reason of the demands of menstruation and pregnancy. Post-haemorrhagic anaemia was largely conditioned by diet, and frequently large doses of iron effected a cure. Anaemia consequent upon chronic sepsis or intoxication would only respond to cure of the primary condition. Other deficiency anaemias included those due to a lack of vitamin C, copper, bile pigments, and chlorophyll. There was also a large group due to a deficiency of the pernicious anaemia factor and responding to marmite or liver, and also others of which pernicious anaemia was an example, responding to liver products only.

The PRESIDENT said that, as a clinician, he experienced certain difficulties—for example, notwithstanding an extensive experience of anorexia nervosa, he had yet to see a case of this malady which exhibited signs of vitamin deficiency. He was unconvinced that a nutritional factor played a part in the causation of many gastro-intestinal disorders, and he inquired as to the possible effects of vitamin excess. He believed that, so far as beri-beri was concerned, it was necessary for an infection to be present, in addition to vitamin deficiency. Dr. C. C. UNGLEY (Newcastle-upon-Tyne) described three cases in which a polyneuritis resembling that in beri-beri occurred in association with disorders of the gastro-intestinal tract and responded to injections of vitamin B_1. Professor PETERS suggested that the President should treat a case of anorexia nervosa with vitamin B_1.

Later, Sir Robert McCarrison gave a lantern demonstration on the pathology of dietary deficiency, and Mrs. May Mellanby and Dr. J. J. D. King (Sheffield) a demonstration of dental disease in experimental animals and man.

SECTION OF DERMATOLOGY

Wednesday, July 22nd

Preventive Measures in Dermatology

With the President, Dr. S. E. DORE, in the chair, Dr. R. M. B. MACKENNA (Liverpool) opened a discussion on preventive measures in dermatology.

Dr. MacKenna began by considering some of the problems presented by psoriasis—for example, whether psoriatic persons should marry, in view of the recognized influence of heredity in this condition; whether the severity of the condition depended on the inherited characteristics of the individual, on his environment, or on his lack of adaptation to that environment; and the influence of fat metabolism. He said that prophylactic measures against occupational dermatitis fell under three heads: (1) the selection of employees; (2) the selection of materials; and (3) active methods of prophylaxis. With regard to (1), the exclusion from irritating processes of those who suffer from hyperidrosis, seborrhoea, xerodermia, and hyperthyroidism and hypothyroidism would probably reduce the incidence of the disease. Much could be done in the way of active prophylaxis. Cleanliness and the use of fatty "barrier" substances with which to coat the hands before work were two important factors. Highly alkaline or chemical solvents or grit in the cleansing preparation, however, might in themselves be productive of dermatitis.

Dr. AGNES F. SAVILL thought that the adoption of a correct diet was the most important prophylactic measure in dermatology. Vulval pruritus and eczema could be prevented in most cases by treating vaginal and urethral discharges. Electrical methods were the best for these conditions. Discussing the dangers associated with cosmetics, Dr. Savill said that the continual use of face cream without any soap and water might lead, in some cases, to the formation of telangiectases. A greater danger, however, arose from the various materials of which cosmetics were made, which might be irritating or actually dangerous. Powders often contained orris root, to which some people were sensitive. Vermilion, a mercurial salt, was no longer employed for colouring, but some of the other colouring matters might be injurious. Perfume was often responsible for irritation produced by powders, lotions, and creams. The erythema and pigmentation that occasionally followed the use of perfume when the skin was subsequently exposed to strong sunlight seemed to be due to the spirit in the perfume. To give a violet or jasmine odour methyl heptine carbonate was employed; in other preparations benzylidene acetone and aromatic aldehydes were often present. All these substances tended to irritate the skin. Vanishing creams required an excess of free stearic acid to prevent an irritating alkaline reaction developing when the cream was stored. Hair-dyes, especially those containing dyestuffs of the paraphenylenediamine group, might cause any degree of dermatitis; they also gave rise to slow systemic poisoning. Cases of conjunctivitis, one of which was fatal, had been recently reported in America, where these dyestuffs had been used to darken the eyelashes. Mercurial lotions were employed for the hair with impunity, and mercurial dermatitis and poisoning had, in at least one case, been traced to this source. Cholesterol had been in favour of late, especially on the Continent, for the treatment of seborrhoea. Experiments had been reported to suggest that it was not as harmless as might be supposed.

Dr. ALICE CARLETON (Oxford) said that a new element of danger had been added to depilatory preparations by the inclusion of thallium acetate. Rudolph had recently reported a case of a woman who had used a face-cream containing 7 per cent. of thallium for fourteen months, with resultant optic atrophy, gastric pain and vomiting, and stiffness of the limbs. She did not agree with Dr. Agnes Savill about the harmful effects of the everyday use of cold cream and vanishing cream. No proof existed of their deleterious nature, whereas there was some partial proof to the contrary. McCafferty and Genovese had experimented with cold cream, and could find no "blocking of the pores." And she herself had experimented with vanishing cream using one side of the face as a control. It produced slight desquamation in only 1 out of 40 cases, and in the others was either neutral or beneficial in its effect.

Dr. J. GOODWIN TOMKINSON (Glasgow) said that there were so many cases of comparatively benign psoriasis and so many instances where there was no history of inheritance that it should not offer any obstacle to matrimony. Obviously there were many cases where the disease was transmitted, as every dermatologist knew, but this alone should not lead him to put his professional ban on such patients marrying. Unfortunately, from time to time, cases of practically universal distribution occurred. In such instances the patients themselves would hesitate to make or accept a proposal of marriage. With regard to occupational dermatitis, there were so many factors concerned in its production that until better methods of selection of employees and more effective means of protection were devised, it would continue for a long time to demand the attention of all practitioners. In the matter of solar irritation of the skin at Alpine altitudes, the free

application of vaseline or lanolin before exposure was of some considerable prophylactic value, but it should on no account be used if a dermatitis, due to neglect of such protection, had already occurred.

Dr. Sybil Horner spoke of the importance of examination of new workers, preferably by a dermatologist and by a works nurse or other responsible person, when they were actually in employment. The use of a "barrier" substance on the skin before work to limit contact with irritants and to facilitate cleansing was perhaps the greatest advance in preventive measures. There were at least two sides to the question of cleanliness. Too great zeal in the removal of dyes and french polish from the skin might itself be the cause of dermatitis. With regard to the recurrence of industrial dermatitis, it was important to remember that the risk of this was increased if (1) work was continued after the onset of dermatitis, and (2) a return to work was allowed too soon. There should be a period of three to four weeks after the skin appeared normal in every way. Dr. Dore had not found natural or artificial sunlight a preventive of relapses in psoriasis.

Dr. Sydney Thomson said personal experience discounted the value of a fat-low diet in psoriasis. Sunlight seemed to lose its virtue as a prophylactic measure after some years, and family histories of psoriasis could be elicited in less than half the cases. He agreed with Dr. Savill's comments concerning the caecum, colon, etc., and added that pelvic infection—for example, tubal—might be suspected in acne which started in the early twenties in young women who had hitherto been normal. The inclusion of known irritants in cosmetic preparations did not affect the main question of simple creams. Certainly simple soaps often caused erythema and desquamation. Cosmetics probably did not cause any appreciable ill effects if no dyes, scents, or caustic chemicals were employed.

Dr. Norman Burgess (Bristol) had shown a series of cases in 1931 in which two unrelated psoriatics had married and all of whose three children were affected with the disease. He would say that two psoriatic persons should not marry, but that there should be no ban to the marriage of a psoriatic person with a normal individual. He had been disappointed in the results of treatment of psoriasis with a fat-low diet, and had seen exacerbations of the disease after unwise over-exposure to the sun. With regard to occupational dermatitis, an important factor in prophylaxis was the efficiency of the welfare worker. He agreed with Dr. Savill as to the importance of a proper diet in the treatment of the seborrhoeic state. He stressed the importance of the treatment of retro-auricular fissures in the case of infective diseases in order to prevent acute attacks of impetigo of the scalp. Much could be done to prevent the spread of epidermophytosis of the extremities in institutions: regular inspection of students and staff, the provision of clean bath-mats for each person, the prohibition of walking about in bare feet, the wearing of bathing shoes, daily washing and powdering of the feet, and the daily scrubbing of bathrooms and shower-baths. In lupus erythematosus, xerodermia pigmentosum, and hydroa, in which patients were sensitive to sunlight, a quinine protective cream should be applied before exposure to sunlight.

Angiomata of the Skin

Dr. Robert Klaber, in a paper on the treatment of angiomata of the skin, said that Morgan's spots or senila angiomata often called for the assurance that they were only related to cancer in a common age-incidence. Usually no treatment was required. Spider naevi or stellate angiomata could be easily treated by the galvanic cautery point or electrolysis. The former method was preferable in the case of children, the latter being reserved for adults. Naevus flammaeus, or port-wine stain, was notoriously resistant to treatment. The capillary naevus was best treated by the use of the CO_2 snow pencil, which usually gave a good cosmetic result. When this condition was combined with a subcutaneous cavernous naevus this method was too often ineffective. Excision or the injection of sclerosing solutions was best reserved for special regions. The areas most usually affected were the scalp and face, and here some form of gamma radiation was required. There were technical disadvantages in the use of x rays. The surface application of radium needles approached the ideal, but was only possible in the larger centres. The same was true of radium plaques, which had certain other disadvantages. Dr. Klaber described and demonstrated the use of radon seeds to form a plaque on adhesive sponge rubber. This method was especially useful where radium needles were not available, and produced equally satisfactory results.

Seborrhoeic Dermatitis

Dr. G. H. Percival (Edinburgh) read a paper on seborrhoeic dermatitis.

He said that seborrhoea indicated excessive activity of the sebaceous glands. The term had come to be used as a descriptive adjective for catarrhal conditions affecting certain areas. Finally, so many other forms of eczema had been so described as to give rise to considerable confusion. These eruptions should be considered as belonging to three main groups:

1. *Seborrhoea.*—This was probably dependent on some endocrine disturbance, though *Bacillus acnes* might play a part in some of its secondary manifestations. It was often associated with premature baldness, acne, or rosacea.

2. *Pityriasis.*—This condition was associated with infection by a yeast-like organism, the co-called pityrosporon. Its simplest form, pityriasis capitis, or ordinary dandruff, might be complicated by more definite inflammation producing dry petalloid eczematides (seborrhoeides) on the trunk, which sometimes became generalized. *Staphylococcus albus* was then found in large numbers together with the pityrosporon.

3. *Flexural Eczema.*—This group was characterized primarily by moist lesions affecting skin folds (intertrigo). The region most frequently affected was the retro-auricular fold. The infra-mammary and intergluteal regions were the next most frequent starting-points, but any of the other flexures might be involved. The condition spread symmetrically outwards from the centre. Sudden symmetrical involvement of the trunk and limbs might occur later. The streptococcus was usually present, and probably played an important part in the aetiology. Attempts to reproduce the condition in volunteers by the applications of streptococcal poultices, however, had so far been unsuccessful.

INTERNATIONAL UNION AGAINST TUBERCULOSIS

The Italian Government has decided to grant for the year 1936–7 six scholarships at the "Carlo Forlanini" Institute in Rome. The conditions are as follows:

These competitive scholarships, of a value of 3,000 lire respectively, plus board and lodging, are intended to enable foreign medical practitioners to stay at the "Carlo Forlanini" Institute in Rome for the purpose of following a course of studies. This stage of eight months will correspond with the academic year (from November 15th to July 15th), including the usual holiday periods.

The scholars will reside at the Institute. The scholarships will preferably be awarded to young physicians who are already familiar with tuberculosis problems, and who wish to improve their knowledge of this branch of medicine. The kind of work undertaken at the Institute will be subject to an agreement between the director and the candidate. The publication expenses resulting from this work may be defrayed partly or entirely by the Institute.

The scholarships will be awarded at the next session of the executive committee, which will meet in Lisbon on September 7th, 1936. The names of candidates, accompanied by particulars as to their age, qualifications, and professional experience, must be forwarded *not later than August 19th* to the secretary, National Association for the Prevention of Tuberculosis, Tavistock House North, Tavistock Square, London, W.C.1.

INTERNATIONAL CONGRESS OF MICROBIOLOGY

SEVEN-DAY MEETING IN LONDON

The second International Congress of Microbiology was held in London (at University College and the London School of Hygiene and Tropical Medicine) during the last week of July, and attracted numbers which taxed the resources of those buildings to the full. Representatives from more than thirty countries were presented to the Lord President of the Council (Mr. Ramsay MacDonald) at the opening meeting. The president of the congress was Professor J. C. G. LEDINGHAM, and there were four presidents of honour—Professor JULES BORDET of Brussels (who was president of the first congress six years ago), Sir ROBERT MUIR of Glasgow, Professor G. H. F. NUTTALL of Cambridge, and Sir JOHN McFADYEAN of London.

Introductory Proceedings

Professor Ledingham, in his opening address, reminded the gathering that these congresses had come into being through the efforts of the Health Section of the League of Nations to reconstitute that friendly exchange of scientific opinion which had been interrupted by the world war. They were really a continuation of the Congresses of Hygiene and Demography, the last of which was held in Washington in 1913 ; but it was unlikely that those old congresses would have survived even had there been no war, or at least the extraordinary development of bacteriology and microbiology would have rendered some subdivision necessary. At the previous congress they had worshipped at the shrine of Pasteur ; on this occasion they had gone much further back into history, and had thought it fitting to engrave on their badges Antony van Leeuwenhoek (1632–1723), the Dutch microscopist, who had first represented bacteria in a drawing. Professor Ledingham added that the most valuable features of such congresses were not the papers and arranged discussions, but the informal interchanges and personal contacts.

"Monumental" is not an exaggerated expression to apply to the congress proceedings. The papers numbered about four hundred, the great majority of them in English, and of the remainder far more German than French. They were distributed over eight Sections, occupied respectively with the general biology of micro-organisms, with viruses and virus diseases in animals and plants, with bacteria and fungi in the same relation, with economic bacteriology, with medical, veterinary, and agricultural zoology and parasitology, with serology and immunochemistry, with microbiological chemistry, and with specific immunization in the control of human and animal disease. America supplied half of the sectional presidents—Professor H. ZINSSER of Harvard, Professor W. H. PARK of New York, Professor K. LANDSTEINER of the Rockefeller Institute, and Professor R. E. BUCHANAN of Iowa.

Characteristics of Viruses

The subject of virus characteristics occupied one of the Sections for two days. Dr. A. R. DOCHEZ and others from New York brought forward studies conducted over a period of ten years revealing the presence of a filterable virus in the upper respiratory tracts of human beings suffering from the common cold and influenza. The presence and activity of this virus had been demonstrated by the experimental production of similar diseases in chimpanzees and human volunteers following inoculation of bacteria-free material containing the virus. They added that inoculation of the culture virus in general did not produce the typical clinical picture of influenza, but one more nearly resembling that of the common cold. Dr. H. S. FRENKEL of Rotterdam contributed a paper on the virus of foot-and-mouth disease, which can be grown easily in the skin of the embryos of the cow and sheep ; Professor S. P. BEDSON, on the psittacosis virus, which was, he said, a highly specialized parasite, a living micro-organism with an intracellular habit of life ; and Dr. S. NICOLAU of Paris, on the virus of rabies. Some remarkable work on plant viruses was brought forward from Rothamsted by Dr. J. HENDERSON SMITH, who mentioned that the virus of the curly-top disease of sugar beet could infect 300 species of plants. Mr. J. E. BARNARD described the apparatus used at the National Institute for Medical Research for the microscopy of viruses, and Dr. W. J. ELFORD discussed particle size. The scale of viruses and bacteriophages is overlapped at its upper end by certain cultivable organisms, and at its lower end overlaps the larger proteins. Dr. G. HARDY EAGLES brought forward evidence suggesting a possible virus aetiology in rheumatoid arthritis and some relation to acute rheumatic fever. Pericardial and pleural exudates, joint fluids from acute rheumatic fever, and joint fluids and synovial membrane from acute and subacute rheumatoid arthritis, had yielded suspensions of elementary bodies which in stained preparation and by dark-ground examination were indistinguishable from elementary bodies demonstrable in similar suspensions from recognized virus infections.

Control of Whooping-cough and Diphtheria

In opening the Section dealing with specific immunization in the control of disease Professor W. H. PARK described an investigation carried out in New York City to determine the value of pertussis vaccine in preventing infection. Though the incidence of pertussis in New York is comparatively low among the unvaccinated children, there was a marked reduction in the number of cases among the children that were vaccinated with 65 to 88 million bacilli (the approximate level of dosage for prophylactic vaccination) as compared with the unvaccinated controls. His conclusion was that pertussis prophylactic vaccination with potent vaccines and adequate dosage seemed desirable. Professor TH. MADSEN, speaking on the control of whooping-cough in Denmark, said there was almost universal agreement that, used early in the disease, whooping-cough vaccine shortened its course and mitigated the symptoms. Dr. A. D. GARDNER of Oxford described the difficulties and applications of the cough-plate method, and Dr. N. SILVERTHORNE of Toronto gave the results of the examination of 600 children by that method, of whom 359 had clinical whooping-cough. There were 98 per cent. positive cough-plates in the first week of the disease.

Dr. R. A. O'BRIEN discussed the control of diphtheria and the comparative value of various prophylactics. Immunization had protected, he said, even against "gravis" infection, nurses who were tending severe cases of diphtheria. Further experience might indicate the necessity for a more intensive course of injections for the general population. Dr. G. CHESNEY of Poole related a fifteen-months experience of the use of two small doses of the alum-precipitated toxoid prophylactic, given subcutaneously, at an interval of four weeks. He had obtained a Schick-negative rate of virtually 100 per cent. after immunization. Over 500 children, ranging from 1 year to 14, had been treated, and reaction difficulties had been minimal and negligible. Among others who contributed to this discussion were Professor J. G. FITZGERALD of Toronto, Dr. G. RAMON of Garches, and Dr. I. H. MACLEAN of London.

Pathogenic Streptococci

A discussion on pathogenic streptococci in relation to a number of infectious conditions was opened by Dr. G. J. HUCKER of Geneva, U.S.A., who pleaded for a

broader consideration of this group of organisms. There had been, in his view, an undue emphasis by earlier workers upon habitat and association as a diagnostic character in the identification of the groups and species. Habitat was not a logical and satisfactory basis. Of more fundamental significance than habitat or source were the reactions which the streptococci produced. Suppurative and acute conditions found, whether in man or in animals, might well be initiated by the same species. He presented a grouping, together with nomenclature and synonymy, of the various species determined and the relations of these species to pathological conditions. Dr. STUART MUDD and other workers from Philadelphia followed with an analysis of the chemical composition and immunological behaviour of the haemolytic streptococci. Dr. C. A. GREEN of Edinburgh described a bacteriological investigation of strains of haemolytic streptococci isolated during an epidemic year. In a series of 1,500 cases the throat swabs taken on admission in the acute phase of illness yielded 85 per cent. positive cultures, which were serologically grouped into eight types. The carrier rate for haemolytic streptococci in patients on discharge was found to be 36.8 per cent., but in only 5.4 per cent. was there evidence of persistent heavy infection. Dr. L. COLEBROOK discussed pathogenic streptococci in relation to puerperal infection, and Dr. A. FINGERLAND of Czechoslovakia gave an account of the occurrence of streptococci in the blood of patients dying of diphtheria. Out of fifty-six cases examined, haemolytic streptococci were found in twenty-seven. Diphtheria bacilli were found in the blood only exceptionally and in the earlier stages of virulent cases. In the later stages of the disease they were never found, whereas haemolytic streptococci were present in great numbers. Sir THOMAS HOUSTON of Belfast gave reasons for believing that the original French authors who attributed potential pathogenicity to the enterococcus were correct.

The discussion in another Section, on antigenic structure, was opened by Professor W. W. C. TOPLEY, who suggested that the approach to immunological problems was changing. Instead of thinking in terms of diseases or of bacteria or their toxins, workers were more and more thinking in terms of antigens and antigenic structure, and were increasingly inclined to analyse immunity to any given infective disease into a series of effects, some anti-bacterial and some antitoxic, each of which was conditioned by a specific antigen-antibody reaction. He believed that the obvious advance whereby it would be possible to use antigens that had been isolated and purified by chemical methods would not be long delayed.

Other discussions of the first two days of the congress were on selective bacteriostasis, opened by Professor A. FLEMING, and on the mechanism of drug action and drug resistance, opened by Professor H. SCHLOSSINGER of Berlin, followed by Professor C. H. BROWNING of Glasgow, who said that the views of Ehrlich and his school on the mode of action of trypanocidal drugs had been generally confirmed by several elegant methods, and that more attention should be paid to exploring different chemical groupings for therapeutic action, since this knowledge was fundamental. This discussion was remarkable for the number of Germans who participated.

Every Section was crowded, and the many members who endeavoured to pay a number of flying visits found great difficulty in entrance and egress. The few social diversions included a Government reception at Lancaster House and receptions by the Royal Society and the Royal Society of Medicine, and scientific visits were arranged to the Royal Army Medical College, the Rothamsted Experimental Station, and various public and private laboratories. In our next issue we hope to give an account of the later proceedings of the congress.

POST-GRADUATE STUDENTSHIPS AND RESEARCH FELLOWSHIPS IN CLINICAL SCIENCE AND EXPERIMENTAL PATHOLOGY

The Medical Research Council has decided to institute a series of studentships and fellowships to encourage young British medical graduates of special ability and original mind towards becoming investigators in those branches of medical science which are concerned directly with disease as it occurs in human beings. This field of research includes investigations into disease or manifestations of disease in patients, together with experimental work of an immediately relevant kind.

Six post-graduate studentships are therefore offered for medical graduates who have already held house appointments and are strongly inclined to a career in clinical science or experimental pathology. Each selected student will receive an inclusive grant at the rate of £200 per annum, during a period not exceeding twelve months, for personal maintenance while undertaking approved courses of study in this country such as may be regarded as best calculated to advance the student's training in methods of research. This study may include modern languages and such advanced physiological, pathological, and special clinical work under recognized teachers as may be regarded as forming a suitable preliminary to serious research work to be undertaken later; but the approved course may not include studies of which the purpose is to enable the student to pass further examinations.

The Council also offers four research fellowships for candidates of similar qualifications who have already had some experience in the use of research methods. Each fellowship will be tenable for one year at the value of £250 per annum, and will be renewable in approved instances at the rate of £300 per annum for a second year. These fellowships are intended as probationary appointments for research in clinical science or experimental pathology under suitable direction in this country. Research expenses will be provided in addition to stipend.

Applications should be lodged with the Secretary, Medical Research Council, 38, Old Queen Street, London, S.W.1, before October 12th, 1936. Forms for the purpose will be supplied on request.

FITTING OF ARTIFICIAL LIMBS

PENSIONS SERVICES FOR CIVILIANS

For many years now there has been a demand, both among members of the medical profession and the public generally, for the knowledge and experience of fitting artificial limbs which have accrued from the work done at Ministry of Pensions hospitals since the war to be made available for the benefit of sufferers outside the ranks of ex-Service men. The fitting of artificial limbs is no longer an empirical business, but has attained a degree of exactitude making it worthy of recognition as a new and highly specialized form of surgical practice. Nevertheless, those members of the public who have had the misfortune to lose a limb have for the most part been denied the benefits of this new knowledge, and have had perforce to turn to the artificial-limb maker, whose knowledge of anatomy may or may not be adequate, for advice on, and for the actual fitting of, the artificial limb. We therefore welcome the decision of the Government, tardy though it is, that the services of the limb-fitting surgeons of the Ministry of Pensions, both at Roehampton and in the provinces, are to be made available to the committee of Queen Mary's Hospital, Roehampton, for the expert adjustment of artificial limbs for civilians.

The official announcement conveying this decision states that the task undertaken by the Ministry of Pensions of providing artificial legs and arms has resulted in the creation at Queen Mary's Hospital, Roehampton, and affiliated centres throughout the British Isles of a highly specialized and efficient organization. The unprecedented demand for limbs which was involved has acted as a stimulus to the production of improved technical devices and higher standards of material and workmanship, while the ingenuity of the technician has been guided into the most desired direction

by the Ministry's surgeon responsible for selecting the most suitable limb for the particular case, and supervising its fitting to the stump in accordance with the surgical requirements. . . . True to the spirit and tradition of the medical profession, the specialized knowledge and experience acquired has been freely communicated to the profession, and lectures and demonstrations on amputation stumps and on the technicalities and the actual fitting of artificial limbs have been given to nominated medical representatives of various public services and medical schools. During 1935 no fewer than 132 surgeons attended these lectures. . . . There has long been a widely expressed wish that the benefit of this service should be extended to civilians. The Governors of Queen Mary's Hospital desired to respond to that wish, and have, in fact, done so for some years for civilians living in or near London. With a view to an extension of these arrangements the committee recently approached the Minister of Pensions with the request that the services of the limb-fitting surgeons in the provinces should also be made available. While welcoming the proposal as being in the public interests, it was considered desirable to obtain the views of the medical profession as to the propriety of giving this assistance. The replies received from the eminent surgeons approached made it abundantly clear that they recognized the deficiencies of existing practice in regard to limb-fitting, and heartily welcomed the possibility of patients obtaining expert surgical advice as to the adjustment of their artificial limbs.

Under the agreement to be entered into (as reported in our Parliamentary Notes at page 265) fees will be charged which will entirely cover all expenses incurred by the Ministry, and the service will be inaugurated as soon as possible. Under no circumstances are the new arrangements to be allowed to interfere either with the practice of any independent surgeon who may wish to supervise the adjustment of an artificial limb in any case in which he has been concerned, or with the supply of artificial limbs by any firm of limb-makers that it may be desired to employ.

Reports of Societies

MANIPULATIVE SURGERY

Sir Herbert Barker's Demonstration

A special meeting of the British Orthopaedic Association was held at St. Thomas's Hospital on July 22nd. In the unavoidable absence of Mr. W. Rowley Bristow, Mr. T. P. McMurray, vice-president of the association, introduced Sir Herbert Barker, who, at the request of the association, had consented to give a demonstration of his methods of manipulative surgery. Mr. McMurray mentioned that it was Sir Herbert Barker who gave manipulative surgery its name some forty-two years ago. Sir Herbert, who was suffering from a severe cold, was unable to speak at any length about his methods, but demonstrated them effectively on some eighteen patients suffering from a wide variety of orthopaedic conditions. The patients were brought in and the diagnosis announced, and he then manipulated them, in most cases under gas and oxygen anaesthesia, in a few without any anaesthetic.

Recurrent Dislocation of the Shoulder

The first case was a recurrent dislocation of the right shoulder in a young man. The initial dislocation had been over eighteen years ago and the condition had recurred many times since then. After a brief examination Sir Herbert Barker said that there was obviously no tear in the capsule in this case, and he proceeded to manipulate the arm, stretching adhesions about one aspect of the joint capsule. He demonstrated the exercise he advised in the after-treatment of this type of case, actually the well-known Army exercise of lowering the body to the floor by using simply the hands and arms. This was done at first with the hands on the floor pointing forward, then turning outwards, and finally turning inwards, this last being a position in which the whole weight of the body is supported by the shoulder-joint, with the humerus internally rotating so far as possible. After manipulation the patient was able to perform this exercise without his dislocation recurring.

A subluxating inferior radio-ulnar joint with a three-years history was treated by traction on the hand, forcible dorsiflexion, and palmar flexion, followed by a "shaking" with the wrist in traction. After this manipulation the patient was able to perform the full range of wrist movement with much less pain.

Tennis-elbow

A case of tennis-elbow was manipulated by placing both thumbs firmly in the antecubital fossa with the fingers firmly gripping the elbow behind, and performing a "shaking" movement with the arm in forcible hyperextension: hyperextension being first in supination, then semi-pronation, and finally in pronation, after which the elbow was forcibly flexed, again with the forearm in the three varying positions. Further cases of tennis-elbow were manipulated, and Sir Herbert Barker demonstrated in some detail the exercises he advised in the after-treatment of this condition. Fingers, wrists, and elbows are completely extended with the forearms in supination and the hands pointing towards the floor. The elbows and wrists are then slowly and powerfully flexed with the hands flexing slowly to take up a claw position, becoming finally a tightly clenched fist with full flexion of both wrists and elbows. This manœuvre is then reversed and the arms and wrists slowly extend and the fingers pass back from the clenched fist position to full extension with wide separation of the fingers. The exercise is repeated several times, first with the forearm in supination, later in semi-pronation and finally in full pronation. Sir Herbert Barker suggested that perseverance with this exercise would improve any player's ability at tennis, whether they had had a tennis-elbow or not.

Lumbo-sacral Pain

Bilateral lumbo-sacral pain was treated, without an anaesthetic, by manipulations which included manual pressure on the sacro-iliac joints, the patient lying prone; forcible hyperextension of the slightly abducted thighs; and forcible flexion of the leg and thigh, again in slight abduction, with the patient lying on her back. A similar case was treated by forcible pressure on the lumbo-sacral region with, at the same time, hyperextension of the spine by lifting the shoulders up with the head extended, the patient being prone. This was followed by hyperextension of the thighs, singly and together, with continued manual pressure on the sacral region, and then the full range of flexion, adduction, and abduction was gone through with the patient lying on her back.

A case of early flat-foot in a girl of 11 was dealt with by traction of the foot, followed by forcible inversion. The exercises used in the after-treatment of these conditions are of the orthodox heel-raising type, with the toes turned in and the heels out, and walking on the heels and walking on the outer borders of the feet—that is, with both feet in inversion. A hallux rigidus, in a girl of 13, was treated by forcible traction to achieve partition of the articular surfaces followed by forcible dorsiflexion, plantar flexion, eversion, and inversion.

Internal Derangement of the Knee-joint

A stiff hip, following dislocation, was manipulated in the orthodox manner, and in this case Sir Herbert said that his manipulation "might or might not do the patient some good." Three patients with recurrent displacements of the internal semilunar cartilage were treated by forcible internal rotation of the tibia and fibula on the femur, and hyperextension with one hand on the heel and one on the knee. In these instances, so far as could be seen, Sir Herbert Barker's assumption is that all semilunar lesions are initially of the bucket-handle type. By this manœuvre he would seem to aim at splitting the cartilage right across, so that the ends retract out of the joint cavity.

A woman of 57 with an early arthritis of the knee, the *x*-ray showing some lipping, complained of pain on the inner aspect of her left knee with some pain on extension. There was no history of rheumatism. This case was treated by forcible flexion and extension of the knee.

Conclusion

Altogether about twenty patients were demonstrated. In the first manipulation he undertook—namely, that of recurrent dislocation of the shoulder—the demonstrator said "I cannot tell you exactly what I do, I just do it," and it seemed throughout that his methods of manipulation were all on this same empirical basis. It was noticeable, too, that the manipulations he employed might all be described as orthodox. Points worthy of mention were that in dealing with almost any of the limb-joints Sir Herbert Barker's first manipulation was almost invariably forcible traction ; his manipulations in many cases were performed before full relaxation had been obtained—that is, at a stage of anaesthesia when the joints were still protected by muscle spasm. The force he used was considerable, and he displayed in some cases remarkable dexterity. At one stage in the proceedings, which were very informal, Lord Moynihan and Mr. Harry Platt amongst others admired the remarkable musculature of his hands and wrists. Perhaps the only patient demonstrated who would have been treated differently in the hands of an orthopaedic surgeon was the case of arthritis of the knee.

Over a hundred orthopaedic surgeons were present from all parts of the country, and the warm thanks of the meeting for a most interesting demonstration were conveyed by Mr. McMurray.

England and Wales

Nutrition of Expectant and Nursing Mothers

Sir Kingsley Wood, the Minister of Health, received a deputation on July 21st from the People's League of Health. It was introduced by Professor James Young, and the other members were: Professor F. J. Browne, Professor Stanley Davidson, Mr. H. Davies, Professor J. C. Drummond, Mr. Eardley Holland, Dame Louise McIlroy, Dr. Elwin Nash, Dr. W. H. F. Oxley, Dr. Eric Pritchard, Mr. Louis Carnac Rivett, Mr. W. T. Russell, Miss Jean C. Wishart, and Miss Olga Nethersole, founder and honorary organizer, People's League of Health. The object of the deputation was to submit the conclusions arrived at by a special committee appointed by the League to consider the nutrition of expectant and nursing mothers in relation to maternal mortality and morbidity. The members informed the Minister that the investigation had been based on a preliminary survey carried out by a committee containing authoritative representatives of obstetrics, paediatrics, and dietetics, and on the recommendation of the committee the League proposed to investigate the influence of the nutrition of the mother on maternal mortality and morbidity and on the physical state of the child. The main object would be the provision to expectant and nursing mothers of those elements which were known to be deficient in the average diet and thereafter to study the effect of this diet on certain measurable features of maternal morbidity and mortality in the mother and of general development, stillbirth, neo-natal death, and the success of lactation in the child. The investigation would be carried out on large groups of women at certain London maternity hospitals which had agreed to co-operate. The committee had come to the conclusion that to administer the reinforced diet to the mothers in the shape of foods which were liable to be consumed by other members of the family would undermine the experiment. Hence the mineral elements and the accessory food factors with which the investigation was more especially concerned would be given in a form designed to eliminate this risk.

The Minister, in reply, cordially welcomed the proposed experiment. As the deputation knew, an investigation was now being made by expert medical officers of the Ministry in those areas where the maternal mortality rate was high, but further investigations would undoubtedly be of assistance, and he wished to encourage the League in what it was doing. It was happily true that the maternal mortality rate was low in this country as compared with other countries. But one could not remain content with the rate at its present level, and it would be unfortunate indeed to minimize the importance of the problem. The problem was not one only of poor areas: high maternal mortality rates occurred also in prosperous areas.

Founder's Day at Epsom College

Founder's Day was celebrated at Epsom College on Saturday last in the presence of a large gathering, though the weather was not too favourable. Proceedings opened with a service in chapel at 12 noon. After lunch an interesting assault-at-arms was given in the open by members of the gymnastic eight, boxing and fencing teams, and the junior instructors' class. Big School was packed to overflowing at 3.30 p.m. for the distribution of prizes by Commander A. R. J. Southby, M.P. for Epsom. The head master summarized the past year's events and announced the examination results, which had been received that morning. Although those for 1935 had been good, those for this year were better still. He paid a great tribute to Sir Raymond Crawfurd, M.D., who had just retired from the chairmanship, and said that the masters and boys would miss him every bit as much as the council, because he was their guide, counsellor, and friend. Commander Southby, after distributing the prizes, made a short speech, which appealed to the boys because it was what might be expected from the Royal Navy—bright and breezy, and entirely unlike the usual Founder's Day oration. Behind his wit was a very definite encouragement for the future. The proceedings closed with a vote of thanks to Commander Southby by Dr. Henry Robinson, the new chairman of the council. Rain unfortunately put an end to the cricket match when it was in a most interesting position, but the other activities were continued in spite of showers, and the long day did not come to a close until 10.30 p.m., when the choral society finished their rendering of *Iolanthe*.

A Year of Progress at the Middlesex Hospital

The year 1935 was an important one in the annals of the Middlesex Hospital, for the completion of its reconstruction coincided with the bicentenary of its foundation. The new buildings provide accommodation for a total of 700 patients, but unfortunately lack of funds limits the present number of beds to 592. Work is in progress on the establishment of the department of radiotherapy and research, which is scheduled for completion in the course of the year. The Middlesex Hospital has been entrusted with the administration of a radium pool, which also serves the needs of seven other hospitals, thus effecting a desirable economy in the use of radium. Another innovation is the Courtauld clinical unit, providing for the close collaboration of the professors of pathology, biochemistry, and physiology with the clinical staff in the treatment and investigation of disease. The chairman of the Board, Prince Arthur of Connaught, in drawing attention to the question of rating, describes as a "fantastic anachronism" the continued levying of heavy rates on voluntary hospitals which perform valuable public work.

Merseyside Hospitals Council

During 1935 the total income of the Merseyside Hospitals Council was £167,049, an increase of £5,670 over the previous year. The annual record of the council gives these figures and also an interesting survey of the year's working. The progress of the 1d. in the £ Fund is clearly shown by the marked increase in contributors, these numbering at the end of 1935 309,267, and the total sum contributed £125,961. Employers contributed £26,675. The average amount from each contributor is under 2d. a week, and this, says Lord Cozens-Hardy in his report, "is inadequate and not commensurate with the valuable and costly services received in return." The annual record contains an interesting survey of Merseyside Hospital finance and detailed statistics of the distribution of funds. The *Guide to the 1d. in the £*

Fund which has just been published is an informative little book containing full details of the working of the fund, including the rules and regulations of the scheme and much useful information regarding hospital service. Copies of the *Guide* are to be distributed to the 6,000 firms and organizations on Merseyside where the fund is in operation and to the 684 depots receiving weekly contributions from individuals. A complete index is provided and a series of questions and answers on the operation of the fund.

A "Hospitals Week" for London

During the past few months London hospitals have had under consideration a request from the Commissioner of the Metropolitan Police that the number of flag-day appeals in London and Greater London should be limited. In 1935 hospital flag days in London and its outlying districts numbered sixty-six, so that restriction to a single day of intensive appeal, as suggested by the Advisory Committee on Street Collections, was regarded as impracticable. The representatives of the hospitals have recommended that one week in each year shall be appointed as a Hospitals Week provided no other street collections for any object are held in the fourteen days preceding the beginning of that week. Emblem or flag days will be held on a maximum of three days during Hospitals Week, and will be arranged only on behalf of the hospitals. Not more than one of these collections will be held in the same area, and the total sum collected will be equitably divided among the co-operating hospitals. There will also be one additional emblem day, probably in October of each year, on which some section of the London hospitals may make collections. A central committee has been established, with Lord Luke as its chairman, which will be responsible for all future arrangements, and no hospital will be allowed to arrange an emblem day except in conformity with its scheme. Of the problems before the committee not the least will be the allocation of selling areas to particular hospitals. The new arrangements will come into force in 1937, and the week May 2nd to 8th has been provisionally chosen. It is understood that these provisional recommendations are liable to revision after 1937 if the new arrangements yield results less valuable than the old. The committee is confident that London will take Hospitals Week to its heart. It states that most people can estimate with some degree of accuracy what they have been in the habit of giving in a year of flag days, and they should put not less than that sum in the box when emblem day comes round during Hospitals Week, adding just a little more in case they have miscalculated.

Scotland

Presentation to Principal Bradley

Dr. O. Charnock Bradley, principal of the Royal (Dick) Veterinary College, Edinburgh, was recently presented with his portrait, the work of Mr. Stanley Cursitor, A.R.S.A. In making the presentation on behalf of the University, the Dick College, and other friends, Sir Thomas Hudson Beare said that Dr. Bradley had joined the staff of the Royal (Dick) College in 1900, and had been principal for twenty-five years. He was a great teacher and a man distinguished in the world of research, but he had also a gift for administration which had been of the greatest value in the development of the Veterinary College. He had brought out several of the standard textbooks for veterinary workers, and had published well over a hundred papers in various scientific journals. Dr. Bradley, in reply, said that the college had extended since 1911 from seventy or eighty students to 300, and the staff from eight to its present complement of twenty-six. He had had extraordinarily good fortune during his twenty-five years of administration, and he especially desired to express his gratitude to former members of the Department of Agriculture as well as to the staff and governors of the college.

Astley Ainslie Institution

The report for 1935 of the Astley Ainslie Institution, Edinburgh, which receives convalescent patients from the Royal Infirmary, shows that the 169 beds in the institution have been fully occupied during the year, and that 1,042 patients have been treated. The average duration was more than ten weeks, and the maintenance cost per bed for the year was £138 12s. Children treated in the institution numbered 216, of whom 183 were of school age, and of these 160 received instruction in the institution. A department for occupational therapy for adults has done increasingly good work, and 260 of the patients have been treated in this manner with advantage. As this institution is fully endowed, there is no appeal to the public for subscriptions.

Welfare of the Blind

Local authorities are being appealed to for orders for work done by blind persons. The obligations of the Edinburgh Royal Blind Asylum and School are growing, and the financial burdens become heavier yearly. There was a deficit of £10,000 on last year's working, which would have been alarming had it not been for the legacies which have enabled the school to meet the deficit without drawing on capital. It is held that much could be done by local authorities to absorb the output of the school, for the products of the workshops compare favourably both in quality and in price with articles produced elsewhere. The school has a record number of blind children on its roll at present, and is the national school for the blind in Scotland. The residential home for blind women, opened in 1929, has been a great success; without the provision of this home many of the inmates would have had to be accommodated in institutions under local public assistance.

India

Malaria Campaign in Burma

In the rural areas of Burma malaria is the chief cause of mortality and ill-health, the infection being widespread. An illuminating account of the difficulties met with in dealing with this scourge is recorded by Lieut.-Colonel E. Cotter, I.M.S., the director of public health in Burma, in his annual report for 1934. Extensive schemes of drainage and land reclamation are not practicable, and the issue of cinchona febrifuge tablets is at present the most effective weapon among the villagers. Free issues of tablets are made to those who are too poor to pay for them. In recent years, unfortunately, quack doctors ("sesayas") in the country districts have spread a belief among the people that they are being attacked by a new disease, which they have named "metkalaung. This belief started in the Shan States, and has now spread widely; the disease is nearly always malaria. The "sesayas" teach that the physical signs are pimples inside the anal orifice, and that these must be pricked with a needle or a thorn. These pimples only exist in the imagination of the "sesayas," and the harm done by this heresy has been considerable. The Government has been obliged, therefore, to issue a pamphlet in Burmese to counteract this harmful teaching. In 1934 a severe outbreak of malaria occurred in the Hanthawaddy district. Relapses were frequent owing to the villagers having to return to the fields to reap their crops immediately after the fever had subsided. Most of the villages have on the average three tanks each of drinking water, which are overgrown with aquatic vegetation and are favourable breeding places for the *Anopheles aconitus*. An attempt has been made to cope with this source of infection by the introduction into the tanks of larvivorous fish. Febrifuge tablets are being freely distributed, for the proximity of Hanthawaddy to Rangoon gives cause for anxiety. The present immunity of Rangoon to malaria depends on the very small extent to which malaria mosquitos are found and

the absence of an extensively infected population. Were either of these factors removed, a serious outbreak would become likely. The surrounding rural areas are therefore being carefully watched for outbreaks of malaria, and the Rangoon Corporation is launching an anti-malaria campaign, which it is hoped will preserve for the city its present freedom from this infection. Prophylactic work is in progress in certain districts where refuse destruction, the draining of swampy areas, and oiling or treatment by Paris green are possible. The average consumption of cinchona febrifuge per head of population rose from 0.87 grain in 1933 to 1 grain in the year under review, yet the use of the tablets is still disappointingly low in some of the worst areas, and the necessity of educating the villagers is very obvious.

CORRESPONDENCE

Royal Medical Benevolent Fund: Centenary Appeal

SIR,—As I was unable to say at Oxford all that I wished about the Royal Medical Benevolent Fund owing to the limited time at my disposal, may I crave the hospitality of your columns to add to what I then said.

The centenary appeal in just over three months has provided us with 105 new subscribers and over £3,000 in donations ; the appeal will remain open for several months, but I wish to draw particular attention to the fact that what is required is " new subscribers," so that our income may be kept up. At the meeting of the committee held on July 22nd I had to report that a comparison of the figures for the first six months of this year with those of last year showed that the calls upon our funds have compelled us to give to our ever-increasing number of beneficiaries £7,156, being £1,412 more than in the corresponding six months of last year.

As our distribution during the twelve months of 1935 exceeded the income received in the same period by £691, it is clear that we cannot continue at this rate of expenditure. During the rest of this year, then, the alternatives before us are:

1. To refuse, or to greatly reduce, the help which we are asked to give.
2. To give the help and hope that those who read this letter, and are not already regular contributors, will send subscriptions without delay, and so help us to carry on.

The Fund is doing splendid work, but if we are to continue as heretofore we must have more support. May I therefore request that contributions may be sent to me before the commencement of the summer holidays?—I am, etc.,

LEWIS G. GLOVER,
Honorary Treasurer.

11, Chandos Street, Cavendish Square, W.1, July 27th.

The Medical Curriculum

SIR,—When the conference of representatives nominated by the Universities of Oxford, Cambridge, and London, the Royal Colleges of Physicians and Surgeons, and the Society of Apothecaries was about to meet to consider the medical curriculum, Sir Cuthbert Wallace, since elected President of the Royal College of Surgeons, no doubt desirous of obtaining as many views for consideration as possible, suggested to me that I should send in a memorandum setting forth my views on the curriculum.

The suggestions I put forward are based on the view that the work of the general practitioner and that of the consultant differ not only in degree, but in character. To the general practitioner falls the duty of dealing with the ailments of the community and the still more important duty of maintaining its health—the " Vorsorge " now emphasized by the German Nazi regime as the special sphere of the general practitioner. If this is admitted, then it follows that there are many subjects the general practitioner should be acquainted with, for the proper study of which no provision has been made in the medical curriculum. But no further additions can be made to a curriculum already regarded as overloaded, and consequently some other plan must be evolved for bringing these necessary subjects into the curriculum by some reduction of the other parts. I would suggest, therefore, that for those students who decide to enter general practice the second part of the course should be modified, the course for those who aspire to become consultants and specialists to be as suggested by the conference. In the general practitioner course particular attention would be paid to the commoner diseases, while only such of the rarer diseases would be studied as are necessary for a proper conception of scientific medicine—for example, osteitis fibrosa cystica for the part played by the parathyroids in calcium metabolism. The somewhat neglected subjects—diet, climatology, and balneology—would receive special attention in the course, and the effects of industry and sport on health would be studied. In this connexion it is to be noted that the Germans already have their " sports doctors."

I feel that there is a large and glorious field for the general practitioner, the rich harvest from which is at present being garnered by medically unqualified people. It is a field no whit inferior to that occupied by the consultant, and it is one in which the general practitioner would be pre-eminent. My suggestion is not revolutionary ; it merely endeavours to make possible the development of the schemes for the health of the community suggested by Lord Dawson of Penn and others without overburdening the medical curriculum.—I am, etc.,

London, W.8, July 21st. HAROLD H. SANGUINETTI.

Miners' Nystagmus

SIR,—The letter from Mr. Herbert Caiger in the *Journal* of July 18th (p. 151) is an admirable statement on the nystagmus question, and lucidly expresses a point of view which, if generally adopted, would simplify this difficult matter and tend towards uniformity of medical opinion on the subject. I cannot claim impartiality in this approval, for the suggested line of approach—that is, regarding oscillations as primarily a physiological adaptation, but with potential risks in the event of loss of control—is the one I advanced independently in the early part of April in simultaneous memoranda to the Nystagmus Committee of the British Medical Association and to the Workmen's Compensation Committee of the Home Office, and further urged in evidence before the latter committee on May 22nd last.

The view cannot be better put than in the statement quoted from Dr. Healey in Mr. Caiger's letter, "At first the oscillations are a physiological psycho-optical reflex: they become eventually a pathological habit spasm." This point of view accords with Llewellyn's well-known finding that 25 per cent. of all underground workers have oscillations, but only 0.5 to 2 per cent. have the industrial disease. Medical opinion has been slow to recognize the logic of the position, and tended to regard oscillation as presumably involving some degree of disability from its inception. As a profession we cannot avoid some share of responsibility for the constant fear of nystagmus that is so well known in every eye clinic within reach of a mining area. The influence of any fear

in promoting the actual disease is fully emphasized in recent reports, and it is of first-rate importance that a corrected and happier view should reach the miners, requiring as a first step that medical opinion should become uniform in recognizing a sharp distinction between oscillation—a craft adaptation—and miners' nystagmus—an industrial disease.

In the light of human nature this distinction would be greatly strengthened if the name of the industrial disease could be altered—not a new idea, but one that gains increased point from the suggested pathology. Mr. Caiger stresses again what he has urged before and what the men themselves urge, the importance of suitable work on the surface for affected men. It is known that this facilitates recovery from the disease. It is also stated that in India the miners alternate agriculture with mining and there is no nystagmus. In this country it is found that it takes about 30 years for the average man to develop oscillations. It would presumably lessen the incidence of the disease amongst these older men, practically all of whom have some oscillations, if they could have partial surface work in a rotation of, say, one month on the surface to three underground. This may seem a formidable proposal, but with only 25 per cent. of the men to cater for the suggestion could be carried out by finding 30 surface jobs (6 per cent.) for a 500-man pit. Good will could do much to overcome the difficulties, and with the impending developments of "oil from coal" more surface work, not all technical, will be created and could be reserved for this purpose.

It is, however, probable that any arrangement must fail to achieve its full capacity for benefit until it is accepted that oscillations are the indication of a fully adapted miner, that they are quite distinct from the disease "miners' vertigo," or whatever the disease be called, and that they imply at the worst a "contingent liability" to the disease. The discussion returns as always to the opinion of Coates, quoted and proved many years ago by Llewellyn, that deficient illumination is the cause and that the coming of adequate pit lighting will eradicate the disease.—I am, etc.,

Sheffield, July 19th. E. GORDON MACKIE.

Treatment of Tetanus

SIR,—My remarks are based on personal experience of the treatment of tetanus obtained in a base hospital during the war and subsequently in the Rudolph Virchow Krankenhaus in Berlin.[1 2 3] As Dr. Leslie Cole has pointed out (*Journal*, June 13th, p. 1191), the antitoxic treatment is based on the facts that are known of the distribution of the tetanus toxin in the body. According to H. Meyer and Ransom,[4] and Aschoff and Robertson,[5] the toxin is secreted locally in the infected lesion and ascends along the lymphatics of the nerve to the corresponding section of the spinal cord, and to the ganglion cells of the anterior horn. From here it passes through lymphatic spaces to higher centres. Part of the toxin is conveyed by the blood stream and another part is bound and neutralized by tissue cells, which are not themselves susceptible to the toxin (A. Froehlich and H. Meyer[6]). This latter point is, however, contradicted by the previous findings of v. Wassermann and Takaki,[7] who showed that only the tissue of the brain and spinal cord has the property of binding antitoxin.

R. Gottlieb and H. Freund[8] have shown that there is no proof that toxin can be removed or neutralized once it has been incorporated in the nerve cell. The curative effect is only observed when the toxin is neutralized on its way to the ganglion cells. In their experiments with rabbits which had been injected with three times the minimum lethal dose, the subdural injection of antitoxin proved to be efficient twenty-five to thirty hours after the injection as opposed to only six hours after intravenous injection. After a minimum lethal dose the intravenous injection of antitoxin was always without effect twenty-four hours later, whereas the animal's life was saved after forty to sixty hours and twenty-four hours after the appearance of the first symptoms when the injection was made subdurally through the occipito-atlantoid membrane.

These facts determined the course of the therapy which I recommended for the cases I encountered at the base hospital, where the incubation period was very short, as the patients were always rapidly cleared. Before the introduction of the following technique there was practically 100 per cent. mortality from tetanus.

The patient was anaesthetized and the wound cut out and disinfected, or amputation performed, as soon as possible after a preliminary injection of antiserum in the nerve. In this way new toxin production from tetanus bacilli was prevented as quickly and completely as possible. Lumbar puncture, followed by the injection of antiserum and subsequent elevation of the pelvis, was carried out, and finally antiserum was injected subdurally and bilaterally after trephining small apertures over both hemispheres. The whole of the operation required about ten minutes to perform. It may be seen that as much toxin as possible was removed, together with the cerebro-spinal fluid, and was replaced by antitoxic serum.

After-treatment followed the usual lines of complete rest and prevention of any irritation; serum injections were repeated until the symptoms subsided. I observed, together with Betz and Duhamel, that a patient with an incubation period of only two days, with trismus and typical tetanic convulsions, recovered immediately after the initiation of this treatment, the temperature subsiding in two to three days. Later experience with the method[3 9] confirmed those favourable results. It would perhaps be possible to-day to use a concentrated antiserum introduced by means of suboccipital cisternal puncture.—I am, etc.,

London, W.1, July 21st. ERNST M. FRAENKEL.

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[4] Meyer, H., and Ransom: *Arch. Exp. Path. and Pharm.*, 1903, xlix, 369.
[5] Aschoff and Robertson: *Med. Klinik*, 1915, No. 26, p. 715.
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[7] v. Wassermann and Takaki: *Berl. klin. Woch.*, 1899, No. 1.
[8] Gottlieb, R., and Freund, H.: *Münch. med. Woch.*, 1916, No. 21, p. 741.
[9] Boecker: *Med. Klinik*, 1917, No. 35.

Calcium Depletion

SIR,—I was interested in Dr. Menon's letter in the *Journal* of July 25th (p. 199).

I visited a relative recently who was recovering from what was described as a "bad bilious attack": he is apparently subject to such attacks, and is under medical care. He told me that he was violently and continuously sick for some days, so much so that his doctor feared cardiac collapse. After the vomiting subsided he felt much better, but had a troublesome erythema on the legs, arms, and thighs, with intolerable itching; this lasted several days, and was very distressing. Except for calamine lotion no treatment was prescribed, and he told me there was nothing else to be done, as the cause was not known. Is it possible that the erythema in this case was due to calcium depletion following excessive vomiting?—I am, etc.,

Belfast, July 25th. EVA MCCALL.

Surgery and the Next War

SIR,—Although methods of warfare have undergone certain modifications since 1918, there can be little doubt that in any future war surgeons will be just as much in demand as they were then. Experiences gained, often at heavy cost, in the last war will no doubt be taken advantage of in future, and among these possibly one of the chief will be the efficient organization of personnel, so that such anomalies as civilian dermatologists suddenly becoming operating surgeons on service, or of hospital surgeons in private life being called upon to act as medical officers under surgeons of much more limited experience and inferior qualifications, will not be likely to occur again. But I cannot but wonder whether the civilian hospital surgeon of to-day, called upon to practise military surgery, would be familiar enough with the differences between war surgery and civil surgery to make him as efficient as we might expect him to be on mobilization.

The last war taught many tragic lessons to the young hospital surgeon well trained in aseptic methods, but at first familiar only with the history of antiseptic surgery. There was a long latent period in which surgical disasters were many and great before he became familiar with the requisite antiseptic methods. It is to be feared that with the passage of time these experiences have become dimmed to many and are unknown to others; and, although records are available in the *Medical History of the War* and the war-time numbers of medical periodicals, this information is so scattered as not to be readily accessible. Moreover, much has been learnt since 1918, especially of such subjects as surgical shock and the treatment of wounds made by high explosives or as the result of chemical warfare.

The defect might be remedied in two ways: first, the publication of a concise handbook, to be issued to all hospital surgeons who might be called upon to perform war-time surgery; and secondly, a series of visits to the chief hospitals throughout the country of senior surgeons in the regular services, who would not only meet the hospital surgeons and establish a liaison with them, but might be given facilities for discussing with them such important questions as the transport of the seriously wounded, the treatment of compound gunshot fractures, of head injuries, and of wounds of all kinds, especially those made by chemical agents, the use of which is likely to be seen in any future catastrophe.—I am, etc.,

July 23rd. HOSPITAL SURGEON.

"Under the Influence"

SIR,—During the past few years I have had a perhaps more than average experience of cases which your correspondent "X. Y. Z." (July 25th, p. 199) is pleased to call "under the influence." My conclusions, based on this experience, cause me to disagree with "X. Y. Z." I have always been impressed with the tact, justice, and accuracy of the police. In many cases which I have been called upon to examine there has seldom been one in which I have been in any reasonable doubt that the person has been under the influence of alcohol to an extent sufficient to make him unable to have proper control of a vehicle. The tests prescribed by the B.M.A. are not perfect—few things in this world are—but although it may be possible for a person to be suffering from all of six different diseases which would give positive reactions to all the six tests at one and the same time, the degree of improbability is extreme.

The statement by "X. Y. Z." that no motorist is safe is absurd. A motorist is not stopped indiscriminately by the police and asked to prove himself sober. He is first of all guilty of dangerous or careless driving, which brings him to the notice of the police, and if they think fit he is then examined medically. The single case on which "X. Y. Z." bases his letter is unfair, since if the man was not under the influence it was not necessary to employ such costly means of defence, as he would automatically have been discharged.

When we consider that 154 persons were killed and 1,000 injured in this small country last week, and we realize that even a small consumption of alcohol affects the finer faculties, most sane people will agree that it is better to eschew alcohol entirely if one has reason to suppose that one will be called upon to drive a car in the immediate future.—I am, etc.,

Slough, July 25th. FRANK MOORE.

Vesico-vaginal Fistula

SIR,—I read with much interest the account of an operation for vesico-vaginal fistula by Mr. W. A. Mein in the *Journal* of June 13th (p. 1207). Although my experience is not very great, I believe three factors are essential to the success of this operation with one attempt. They are: (1) free oral exhibition of a safe and sure urinary antiseptic for some days preceding and succeeding the operation—I prefer neotropin (Bayer's) for this purpose; (2) the use of a large indwelling rubber catheter, about three-eighths of an inch in diameter, nearly the size of a stomach or rectal tube—the adult female urethra is dilatable without much difficulty, and when the tube is removed it readily returns to its original condition; (3) unless it is unavoidable never irrigate the bladder after this operation is completed—irrigating it distends the bladder, and the fluid leaks through the unhealed wound. The oversize catheter allows a ready and free flow of urine, thus keeping the bladder nearly empty and contracted till the opening is closed permanently either by primary or secondary union.—I am, etc.,

Colombo, Ceylon, July 7th. I. DAVID.

The Services

DEATHS IN THE SERVICES

Surgeon Captain Edgar Sheldon Wilkinson, R.N. (ret.), died at Weybridge on July 15th. He was educated at Bart's and at the Newcastle School, graduating M.B., B.S. Durham University in 1899. After acting as assistant medical officer at Colney Hatch Asylum, as assistant medical officer at Fulham Infirmary, and as clinical assistant in the skin department at Princess Beatrice Hospital, he entered the Navy. He became surgeon commander on January 1st, 1917, and retired, with an honorary step as surgeon captain, on June 6th, 1925. He served in the war of 1914–18, receiving the medals.

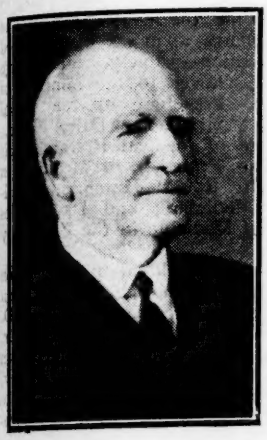
Lieutenant-Colonel John Edward Charnock Ferris, Bengal Medical Service (ret.), died at Attrees, Barcombe, Sussex, on July 20th, aged 87. He was born on March 6th, 1849, at Agra, the son of Lieutenant (afterwards Colonel) William Spiller Ferris, adjutant of the 12th Bengal Native Infantry, was educated at Durham University and at St. George's, and took the M.R.C.S. and L.S.A. in 1872. Entering the I.M.S. as assistant surgeon on March 30th, 1872, he became surgeon lieutenant-colonel after twenty years' service, and retired on August 4th, 1892. His whole service was spent in military employ, most of the time as medical officer of the 1st Bengal Cavalry. He served in the second Afghan War, in 1879–80, receiving the medal. Ferris was the last survivor of the largest batch of men ever admitted to the I.M.S. in one term, forty, on March 30th, 1872. Of these forty, twenty-eight were posted to Bengal, twelve to Madras—none to Bombay. Of the twenty-eight Bengal men six died serving, twenty-two lived to retire, one rose to be surgeon general (Sir Adam Reid, K.C.B.), and four to be colonels. Among them they received one K.C.B., three C.B.s, one D.S.O., and two Good Service pensions, shared by four individuals. Of the four Madras men, six (one-half) died while serving, one became President of the Medical Board of the India Office (Sir Arthur Branfoot, K.C.I.E.), four rose to be colonels; the only decoration was Branfoot's.

Obituary

SIR HENRY WELLCOME, LL.D., F.R.S., F.R.C.S.(Hon.)

Medical science and the study of the history of medicine have lost a far-seeing and munificent friend by the death in London on July 25th of Sir Henry Wellcome.

Henry S. Wellcome was born in 1854 in a log cabin in Wisconsin, U.S.A., where his father was a missionary among the Dakota Indian tribes. He studied chemistry and pharmacy in Chicago and Philadelphia, and then travelled widely over North and South America. Attracted by the idea of London as a manufacturing and distributing centre for chemical industries, he came to England and founded in 1883, with the late Mr. S. M. Burroughs, the firm of Burroughs Wellcome and Co., now known throughout the world as makers of fine chemicals, alkaloids, and pharmaceutical products, with works, offices, and warehouses in many of the great commercial centres in Europe, America, Africa, and Asia. In 1924 the business was taken over by the Wellcome Foundation, with Henry Wellcome as governing director. Long before then he had established a number of research institutions and museums. The first of these was the Wellcome Physiological Research Laboratories, originally set up in London in 1894 and moved later to Brockwell Hall, Herne Hill, and finally to Langley Court, Beckenham. Then followed the Wellcome Chemical Research Laboratories, established in London in 1896.



For the greater part of his life Wellcome collected relics, books, and data in connexion with primitive customs and ancient methods of medical and surgical treatment, and he organized the Historical Medical Museum, which was opened in London in 1913, at the time of the International Medical Congress. This museum, the most extensive of its kind in the world, contains a permanent collection of exhibits illustrating the development of medicine, chemistry, and the allied sciences from primeval times. Its purpose is educational, and it is of great value to students and research workers. In 1913 Wellcome also founded in London the Bureau of Scientific Research, to co-ordinate the work of his separate research institutions as well as to undertake original investigations in tropical medicine, hygiene, sanitation, and parasitology. This bureau places its records, equipment, and experience gratuitously at the disposal of medical men, sanitary administrators, and others interested in tropical medicine and hygiene, and there is associated with it the remarkable Museum of Medical Science, of which we gave a general account on March 3rd, 1934 (p. 393).

In 1931 Lord Moynihan laid the foundation stone of the great building in the Euston Road known as the Wellcome Research Institution. This was designed by the founder to embrace the various research laboratories and museums established by him, to provide for their development, and to co-ordinate and extend their activities.

Sir Henry Wellcome throughout his life was a keen student of archaeology, and carried out extensive explorations in the Upper Nile regions. His deep interest in Ethiopian history in primitive times inspired him to undertake systematic researches. Many objects have been unearthed illustrating the primitive habits, customs, cults, and industries of Ethiopian man in the Stone Age. Large numbers of human remains have been found and studied anthropometrically, anatomically, and pathologically. With the co-operation of the Sudan Government, Wellcome established in 1900 the Wellcome Tropical Research Laboratories at the Gordon Memorial College, Khartum, with the late Sir Andrew Balfour as director. This institution has conducted important investigations into the endemic diseases of tropical Africa, and their relation to bacteriological, entomological, and other local conditions. Many of the great exploring expeditions of modern times have been medically equipped and financially assisted by him. In the South African War he bore the entire cost of the medical and surgical equipment of the hospital ship *Maine*. During the great war he presented to the British Army a completely equipped motor bacteriological laboratory for use in Egypt and Palestine, and placed the scientific staffs and resources of his research laboratories at the disposal of the Government.

In 1927, at the time of the Edinburgh meeting of the British Medical Association, Wellcome received the honorary degree of LL.D. from the University of Edinburgh. The Royal College of Surgeons of England made him an honorary Fellow in 1931, and in the following year the honour of knighthood was conferred upon him and he was elected F.R.S. Sir Henry Wellcome was an honorary Freeman of the Society of Apothecaries of London, an officer of the Legion of Honour, and a D.Sc. of Marquette University, Wisconsin. He became a naturalized British subject twenty-six years ago.

We announce with regret the death on July 2nd, at the age of 84, of Herbert Dove King of Sudbury, Suffolk. Dr. Dove King was a student at Edinburgh and at Leipzig University. He took the B.Sc. of Edinburgh in 1879, and the M.B., C.M. in 1881, proceeding to the M.D. in 1885. He had been clinical assistant at the Central London Throat and Ear Hospital, and medical officer at St. Leonard's Hospital. He was first at Linton, Cambridgeshire, before settling at Sudbury, where he remained in active practice up to his retirement six years ago. For many years a justice of the peace, he was also a keen horticulturist and archaeologist, a medical referee to the Admiralty, and a certifying factory surgeon. Dr. Dove King was a member of the British Medical Association for over fifty-two years. His forty years of active professional life in Sudbury were such that his passing will be felt as a personal loss by many patients and friends there.

Dr. Arthur Herbert Dodd, who died at Bournemouth on July 19th, aged 78, had practised for many years at Hove. He studied medicine at Guy's Hospital, qualifying as L.S.A. in 1883, and obtaining the L.R.C.P. and M.R.C.S. diplomas in 1884, after which he served as clinical assistant at the Evelina Hospital for Children. Dr. Dodd joined the British Medical Association in 1886, and had been in continuous membership for fifty years. After retirement from active work he made his home in Lowther Road, Bournemouth, and became a member of the local Division.

We regret to record the death on July 12th, after an operation, of Dr. Arthur Noel Hodges of Boscombe, Bournemouth. He was born in 1884, the second son of the late Bishop Hodges of Travancore and Cochin, and studied medicine at Cambridge University and the London Hospital. He qualified as M.R.C.S. and L.R.C.P. in 1910, taking his M.B. and B.Ch. degrees in 1914, and proceeding M.D. in 1920 with a thesis on sandfly fever and its differential diagnosis. At the London Hospital he was house-physician, receiving-room officer, and resi-

dent anaesthetist, afterwards serving as house-surgeon to the East Suffolk Hospital, Ipswich. During the war Dr. Hodges served with the temporary rank of captain in the R.A.M.C., and was mentioned in dispatches. He joined the British Medical Association in 1925, and was a member of the Bournemouth Medical Society.

We regret to announce the death of Lieut.-Colonel Thomas Forrest, R.A.M.C.(T.), retired, T.D. Dr. Forrest, who was 67 years of age, graduated M.B., C.M. at Glasgow University in 1890, and four years later took the F.R.F.P.S. He had been house-surgeon at the Western Infirmary, Glasgow, resident assistant physician at the Fever Hospital, Belvidere, and assistant to the professor of materia medica at the Anderson College of Medicine, Glasgow. For the past forty-five years he had been in practice in the South Side of Glasgow, and had been a member of the British Medical Association for the last thirty years, being chairman of the Glasgow (Southern) Division in 1925–6. His interests were always in ophthalmic work, and he leaves a widow, one daughter, and two sons, one of whom practises in the same specialty.

Medico-Legal

"Guilty but Insane"

It is a fundamental axiom of criminal law that a person who is not responsible for his act does not commit a crime. When the act is homicide, the doer forfeits his liberty and is ordered to be detained during the King's pleasure, not by way of punishment but that the community may be protected from his violence and that he may be treated for his mental illness. It has hitherto been the practice for the jury, when they find that a person charged with homicide is of unsound mind, to return the verdict "Guilty but insane." This verdict has for long seemed to us and to many lawyers to be anomalous and offensive, for a person who is not responsible cannot logically be guilty. Perhaps for the first time a judge made a stand against the verdict on July 20th at the Old Bailey.

Mr. Justice Humphreys had had before him a woman who had killed her infant daughter during a fit of insanity. In summing up, he said he thought the phrase "guilty but insane" was unfortunate: it suggested that the accused was guilty of murder, although it was really an acquittal. He preferred the words "did the act charged, but at the time was insane so as not to be responsible in law." The next day a young married woman was charged with the murder of her child aged 3 weeks. It was given in evidence that soon after a previous confinement she had developed symptoms bordering on puerperal insanity, and that after the birth of her second child last May she developed similar symptoms. The baby was found dead in a bath and the woman had injured her own throat. The jury found the accused "Not guilty of murder but guilty of the act charged, for which she was not responsible in law," and the judge directed that she should be detained until His Majesty's pleasure should be made known. It is to be hoped that this logical and humane form of verdict will be followed in similar cases in the future.

"Newly Born"

The latter case gave Mr. Justice Humphreys an opportunity to express a valuable opinion on another point of law. The accused woman was not charged with infanticide, because the Infanticide Act only covers a case where a woman has killed a "newly born" child as a result of not having fully recovered from childbirth. The Court of Criminal Appeal has held that a child just over 4 weeks is not newly born. Lord Dawson of Penn, who gave evidence for the defence, was disposed to widen the definition of "newly born." He said that the term had never been defined in medicine, as it is not defined in the Act of Parliament, but that he regarded it as including the first four weeks after birth. Medical men who study the mortality of the early period after birth are accustomed, he said, to fix a month, and he believed that the Ministry of Health had adopted a month for the purposes of their statistics. Mr. Justice Humphreys, in his summing-up, expressed the hope that Parliament might in the near future be disposed to put a short section into the Infanticide Act giving the definition of a newly born child. If Parliament were disposed to do that, he said, probably nothing would assist it more than Lord Dawson's statement that "newly born" meant, in medical statistics, four weeks.

Universities and Colleges

UNIVERSITY OF OXFORD

Conferment of Honorary Degrees

The Annual Meeting of the British Medical Association at Oxford was made the occasion for the conferment of the honorary degree of Doctor of Science upon six distinguished members of the medical profession—namely, Sir George Newman, formerly Chief Medical Officer to the Ministry of Health; Sir Cuthbert Wallace, President of the Royal College of Surgeons of England; Sir Henry Dale, F.R.S., Director of the National Institute of Medical Research; Sir Walter Langdon-Brown, Emeritus Professor of Medicine in the University of Cambridge; Dr. Robert Hutchison, President of the Royal Society of Medicine; and Dr. Charles Singer, Professor of the History of Medicine in the University of London.

The ceremony took place in the Sheldonian Theatre on July 23rd in the presence of a large gathering. Convocation having been constituted, with the Vice-Chancellor, Mr. A. D. Lindsay, presiding, the proctors, Mr. W. A. Costin and Mr. E. J. Bowen, left the building and returned in procession with the six recipients. The Public Orator, Mr. C. Bailey, addressed the Vice-Chancellor in Latin, and each of the recipients was then presented, shook hands with the Vice-Chancellor, and took his seat on the dais. After the last had been presented the procession was re-formed and the brief ceremony concluded. At each presentation the Public Orator, in accordance with custom, made a short speech in Latin.

UNIVERSITY OF LONDON

The following candidates have been approved at the examinations indicated:

M.S.—(*Branch I, Surgery*): E. S. Lee, E. McLellan.

Academic Post-Graduate Diploma in Psychology.—Florence M. Duncan, L. C. Filby, Thea Henkin, Lydia Jackson, Nellie M. Linzell, Esther Nathan, Ada M. Pethick, Pearl Poster, Catherine G. Symonds, Enid Whiteley, Camille J. M. Wolff.

University College Hospital Medical School

The following awards of scholarships, exhibitions, and prizes have been made for 1935–6:

Goldsmid Entrance Scholarships: J. R. Squire, B. J. Harries. *Goldsmid Entrance Exhibition:* F. L. Dyson. *Filliter Entrance Scholarship in Pathology:* P. G. H. Gell. *Atchison Scholarship:* M. C. Chapman. *Atkinson Morley Scholarship:* D. A. Sanford. *Magrath Scholarship:* Awarded jointly to L. J. Honeywill and T. P. N. Jenkins. *Filliter Exhibition:* Miss R. Billig. *Liston Gold Medals:* B. B. G. Nehaul, G. S. Irvine. *Alexander Bruce Gold Medal:* H. J. Eastes. *Fellowes Gold Medal:* H. M. Sinclair. *Fellowes Silver Medals:* Miss A. J. M. T. Barnes, Miss S. Instone. *Erichsen Prize:* M. A. H. Munshi. *Tuke Silver Medal:* Miss A. J. M. T. Barnes. *Junior Clinical Surgery Prizes:* T. E. Griffiths, Miss I. Tuck. *Ferriere Scholarship:* Miss I. Tuck. *Bilton Pollard Scholarship:* A. S. Wesson, M.D., M.R.C.P., F.R.C.S. *Percival Alleyn Scholarship:* M. P. Ellis, M.D., F.R.C.S. *Leslie Pearce Gould Scholarship:* K. C. Eden, F.R.C.S.

UNIVERSITY OF EDINBURGH

A graduation ceremonial was held in M'Ewan Hall on July 22nd. The following degrees and diplomas were conferred:

Hon. LL.D.—Mervyn H. Gordon, C.M.G., C.B.E., M.D., F.R.S., Consulting Bacteriologist, St. Bartholomew's Hospital.

M.D.—K. A. Abayomi (*in absentia*), G. W. Bathgate, Major R. A. Bennett, R.A.M.C. (*in absentia*), D. A. Cadman, ***Edith K.

Dawson (*née* Chandler), *R. Fawcitt, N. S. Fraser (*in absentia*), **M. E. Gazayerli, W. N. Green, O.B.E. (*in absentia*), ***R. J. S. M'Dowall, *P. C. M'Kinlay, G. S. Norris, *Major T. P. Parr, R.A.M.C. (*in absentia*), *H. A. Raeburn, A. W. Rose (*in absentia*), C. R. White.

M.B., CH.B.—R. Adamson, J. C. Alexander, A. F. Anderson, Flora S. Anderson, Rosemary Arkwright, R. D. H. Baigrie, W. J. G. Barrie, W. V. Bayne, Ida Berry, J. G. Bickerton, J. C. H. Bird, D. K. Black, M. D. Brennan, Doris E. Brown, W. S. Brown, J. W. Bullimore, E. J. Busher, G. M. Calder, A. D. C. S. Cameron, †A. L. DeP. Carnegie, A. S. Cato, H. R. Cayton, F. W. S. Chandler, J. B. Cochrane, T. C. Corson, J. Cowen, A. S. Crawford, R. G. Crawford, L. H. Crosby, D. H. Cummack, Florence E. Cuthbert, Marjory J. Cuthbertson, Winifred M'K. Davidson, R. F. Dawson, Marguerite E. M. Day, M. L. A. Dewan, J. Dewar, J. Dickie, †G. Diggle, I. Douglas-Wilson, J. M. Drever, J. W. A. Duckworth, A. S. Duncan, H. L. Duncan, D. A. Duthie, G. E. W. Finzi, J. C. Fletcher, D. M. Foubister, S. G. M'K. Francis, Agnes C. Gillan, A. A. Gray, M. E. S. Harrison, A. Henderson-Begg, J. R. Hewat-Jaboor, R. S. Hoffman, D. Holland, G. H. Hubbard, Roberta F. D. Hutchison, H. W. Ireland, B. M'D. Johnson, W. F. Kerr, D. R. Kilgour, L. V. Knutsen, Dorothea O. Lang, D. H. Lees, H. Levin, R. Levinson, Edelweiss R. Littlewood, †A. G. R. Lowdon, C. M'Donald, R. Macdonald, W. G. MacDougall, W. A. L. MacFadyen, H. B. A. Macfie, J. MacM. Macfie, D. M'Intosh, G. K. Mackenzie K. A. Mackenzie, G. P. M'Lauchlan, H. Maclean, A. I. S. Macpherson, G. E. M'Vitie, D. B. M'Vittie, C. O. Marr, J. M. Matheson, J. H. D. Millar, W. M. Millar, Mabel G. Miller, W. Moir, W. D. M'K. Moir, Margaret E. Munro, A. A. Murray, W. C. G. Murray, Anna I. Nicol, M. B. O'Neill, †J. Patt, Margaret S. Paxton, W. O. Petrie, A. J. Pinkinsky, O. M. Prichard, †L. L. Rackow, J. W. Rae, D. S. Ramsay, D. A. Reid, H. A. Reid, Jessie C. Ridge, J. Robertson, Marie J. Romagou de Keruzec, R. H. M. Ross, A. J. B. Russell, R. Scott, T. D. Semple, G. C. Sen, H. Singh, A. T. Smith, L. F. Smith, A. E. Stevenson, E. H. Travers, G. S. Waite, W. Wallace, A. Wattison, A. M. Wiesen, L. H. Wilkinson, A. M. Wright, D. B. Ziman.

DIPLOMA IN PUBLIC HEALTH.—C. C. Barclay, N. Chakravarti, S. L. Forrest, S. Rajendram (*in absentia*), K. J. Thomson, A. T. Wallace.

DIPLOMA IN TROPICAL MEDICINE AND HYGIENE.—P. W. R. Petrie, A. L. Sheild.

DIPLOMA IN PSYCHIATRY.—K. Cameron, T. R. Haire.

DIPLOMA IN RADIOLOGY.—J. G. Kininmonth, Joan Lassetter, Margaret C. Tod.

B.SC. IN PATHOLOGY (Second Class).—†J. F. Wilson, M.B., Ch.B.

*** Awarded gold medal for thesis. ** Highly commended for thesis. * Commended for thesis. † Passed with honours.

The following prizes were presented: *Cameron Prize in Practical Therapeutics:* Carl Hamilton Browning, M.D., F.R.S., Professor of Bacteriology in the University of Glasgow, in recognition of his work on the antiseptic properties and the practical applications of acriflavine and other aniline dyes. *Ettles Scholarship and Leslie Gold Medal, Buchanan Scholarship in Midwifery and Gynaecology, Beaney Prize in Anatomy and Surgery, and Royal Victoria Hospital Tuberculosis Trust Gold Medal:* A. G. R. Lowdon. *Scottish Association for Medical Education of Women Prize, James Scott Scholarship in Midwifery and Gynaecology, Conan Doyle Prize, and Dorothy Gilfillan Memorial Prize:* Dorothea O. Lang. *Mouat Scholarship in the Practice of Physic:* G. Diggle and J. Patt (equal). *Annandale Gold Medal in Clinical Surgery and Murdoch Brown Silver Medal in Clinical Medicine:* A. L. DeP. Carnegie. *Wightman Prize in Clinical Medicine:* R. F. Dawson. *Pattison Prize in Clinical Surgery:* E. J. Busher. *Sir Robert Jones Prize in Orthopaedic Surgery:* J. MacM. Macfie. *Goodsir Memorial Fellowship:* K. M. Morris. *Shaw Macfie Lang Fellowship:* W. M. Arnott. *Stark Scholarship in Clinical Medicine:* J. Innes. *M'Cosh Bursary:* T. H. Brown. *Gunning Victoria Jubilee Prize in Botany:* Mary J. M'D. Noble. *Gunning Victoria Jubilee Prize in Physiology:* Patricia Alcock. *Gunning Victoria Jubilee Prize in Obstetrics:* G. D. Matthew. *Lewis Cameron Post-Graduate Prize:* C. E. van Rooyen. *Lewis Cameron Undergraduate Prize in Bacteriology:* May H. Christison and Helen M. Gardner (equal). *Wellcome Medals and Prizes in the History of Medicine:* Gold Medal, H. Miller; Silver Medal, A. M'Kelvie. *Cunningham Memorial Medal and Prize in Anatomy:* A. M'E. Turnbull. *Anderson Henry Prize in Botany:* G. M. Wilson and T. S. Work (equal). *Whiteside Bruce Bursary:* A. K. Bannister.

An address was delivered to the new graduates by the Promotor, Professor W. T. Ritchie, M.D., P.R.C.P.Ed.

UNIVERSITY OF MANCHESTER

Professor H. B. Maitland, M.D., has been appointed Dean of the Medical School in succession to Professor H. S. Raper.

Miss Henrietta Browne has made a gift of £50 in memory of her father, Dr. Henry Browne, to be applied towards the cost of the equipment of the surgical research laboratory.

Mr. H. O. Clarke, F.R.C.S., has been appointed lecturer in surgical pathology.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

Election to Council: Corrected Account

On July 2nd three Fellows were elected into the Council to fill the vacancies caused by the retirement in rotation of Mr. F. J. Steward, Mr. R. G. Hogarth, and Mr. R. E. Kelly. The result of the poll was as follows:

	Votes	Plumpers
CHARLES MAX PAGE (St. Thomas's) ...	710	39
ROBERT ERNEST KELLY (Liverpool) ...	681	60
WILLIAM HENEAGE OGILVIE (Guy's) ...	580	31
Cecil Pembrey Grey Wakeley (King's College)	497	30
Duncan Campbell Lloyd Fitzwilliams (St. Mary's)	311	14
William Edward Tanner (Guy's) ...	259	18

In all 1,107 Fellows voted; in addition eleven votes were found to be invalid. Mr. Page, Mr. Kelly, and Mr. Ogilvie were all elected for the full period of eight years.

BRITISH COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS

The next examination for the diploma (D.C.O.G.) will be held on October 14th (written) and October 28th (clinical and viva voce). Application for entrance to the examination (on the prescribed form obtainable from the honorary secretary, 58, Queen Anne Street, London, W.1) must be made not later than Wednesday, September 9th.

At the quarterly meeting of the Council, held in the College House, 58, Queen Anne Street, W., on July 25th, Sir Ewen Maclean was re-elected president; Dr. Bethel Solomons and Professor R. W. Johnstone were elected vice-presidents; Mr. Eardley L. Holland, honorary treasurer; Professor W. Fletcher Shaw, honorary secretary; Sir Comyns Berkeley, appeal treasurer; Mr. Frederick Roques, honorary librarian.

It was decided that the new regulations for the Membership will come into force in January, 1937.

Professor Naguib Mahfouz Bey was admitted to the Honorary Fellowship of the College.

The following were admitted to the Fellowship:

J. R. G. S. Beard, Adelaide (*in absentia*), E. C. Fahmy, Edinburgh, R. L. Impey, Capetown (*in absentia*), Hilda Lloyd, Birmingham, J. Chassar Moir, London, W. F. Rawson, Bradford, L. Carnac Rivett, London.

The following were admitted to the Membership:

H. G. E. Arthure, London, B. Gilbert, London, E. Holmes, Lancaster, B. L. Jeaffreson, Leeds, F. W. G. Nash, Bedford, S. L. Navaratnam, Colombo (*in absentia*), J. G. O'Donoghue, Melbourne, P. H. L. Playfair, London, G. A. W. Wickramsuriya, Colombo (*in absentia*).

The following were elected to the Membership:

D. A. Abernethy, Oxford, Ida Burchall, Australia, J. R. Borg, Halifax, W. J. Clancy, Sheffield, R. Everett, Blackpool, F. H. H. Finlaison, London, L. W. Gleadell, Melbourne, S. W. J. Harbutt, London, A. M. Hartnell, London, G. Holmes, Uganda, Grace M. Jones, Cardiff, H. A. Kidd, Halifax, D. M. Lindsay, London, Muriel B. McIlrath, Australia, K. F. MacKenzie, Hove, D. J. MacRae, London, G. D. Matthew, Edinburgh, R. B. Meiklejohn, Canada, J. H. Mulvany, London, G. C. Nandi, Calcutta, Mabel F. Potter, Bristol, P. G. Preston, Kenya, M. P. Reddington, London, I. M. Robertson, St. Leonards-on-Sea, M. M. Rosenfield, Australia, E. ap I. Rosser, Edgware, P. M. G. Russell, London, Ruby G. Sharp, Derby, E. C. Sugden, London, A. MacL. Sutherland, Glasgow, R. R. Talbot, New Zealand, Joyce H. W. Wharton, Australia, W. W. Wilson, Australia.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH

At a meeting of the Royal College of Surgeons of Edinburgh held on July 23rd, Mr. Henry Wade, President, was in the chair.

The following, having passed the requisite examinations, were admitted Fellows:

P. S. Bell, B. T. Bernstein, J. M. Clow, C. D. L. Cromar, A. M. Hill, B. T. Hooper, Hsueh-chin Ku, Marjorie J. Lyon, P. G. C. Martin, H. O. M. Merewether, R. S. Ninian, N. W. Nisbet, C. W. R. Price, B. Stein, S. B. Stoker, E. A. Stuart, R. J. F. L. Talbot, C. S. Walker, R. Warden, S. I. Weir.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH

A quarterly meeting of the Royal College of Physicians of Edinburgh was held on July 21st, with the President, Dr. W. T. Ritchie, in the chair.

Dr. Mostafa Hashem (Cairo) and Dr. William Stuart McRae Craig (London) were elected Fellows.

UNIVERSITY OF CAMBRIDGE

CORRIGENDUM

The name of Sylvia D. Bray was misspelt in the list of candidates approved at the examination for the Diploma in Medical Radiology and Electrology, Part II, announced in our issue of July 25th (p. 202).

Medical Notes in Parliament

[FROM OUR PARLIAMENTARY CORRESPONDENT]

Parliament, which began its Summer Recess this week, will reassemble on October 29th. The session will then be prorogued and a new session will open on November 3rd.

Estimates for the Ministry of Health, Board of Control, Scientific Investigation, Broadmoor Criminal Lunatic Asylum, and other services were carried by the House of Commons without debate on July 27th.

The Parliamentary Medical Committee met at the House of Commons on July 27th and decided to invite Lord Dawson of Penn to dine with the committee in the autumn. The committee also asked Mr. Ramsay MacDonald, Lord President of the Council, to receive a deputation about the medical curriculum. Captain G. S. Elliston and Mr. W. P. Spens had hoped to raise this subject during the discussion of the Health Estimates, but were not called to speak.

In the House of Commons, on July 27th, Sir Godfrey Collins presented the Maternity Services (Scotland) Bill, which makes further provision with respect to maternity services in Scotland and amends the Midwives (Scotland) Act, 1915.

In the House of Commons, on July 27th, the Lords amendments to the Shops (Sunday Trading Restriction) Bill were agreed to, with minor amendments.

The Housing Bill and the Public Health Bill passed through committee without amendment, and were read the third time.

The Public Health (London) Bill, which had passed the House of Lords, was read a second time without debate by the House of Commons on July 24th.

The Milk (Special Designations) Order (Scotland), 1936, was laid on the Table of the House of Commons on July 24th.

The Hydrogen Cyanide (Fumigation) Bill was read a second time by the House of Lords on July 23rd, and the Education (Scotland) Bill a third time on the same day.

The Midwives Bill was read a third time in the House of Lords on July 27th and passed.

Unemployment Assistance and Health

During the debate on the Unemployment Assistance Regulations in the House of Commons on July 21st, Mr. MANDER alleged inadequacy in the grants for children. For families with two or more children the proposed scale would not be sufficient to meet the standards laid down for food by the British Medical Association, and for nutrition and clothing and other needs by the Merseyside and other sociological services. The scale for a child of 2 was 3s., and there was a deficiency, according to the British Medical Association scale for food (plus 1s. 2½d. for clothing and light) of 1s. 3½d. For a child of 4 there was a deficiency of 1s. 7½d.; for a child of 6, 1s. 3½d.; for a child of 8, 1s. 4½d.; for a child of 10, 1s. 11½d.; and for a child of 12, 2s. 0½d. That showed what a long way we still were from providing families and children with the nutrition that they needed.

Mr. DALTON said that a study group formed in connexion with an educational settlement had worked on the actual facts of budgets of unemployed people in its area. The group worked on the basis of a family of five persons—a father, mother, and three children still at school, aged 5, 9, and 12—endeavouring to subsist on 37s. 6d. a week, which was the Unemployment Assistance Board's scale. The group studied how in representative cases that money was laid out. The figure for food amounted, according to their investigations, to 15s. a week for the family of five—that was to say, an average of 3s. a head a week. That was in the daily conditions of unemployment without illness. In an expenditure of 15s. a week for a family of five persons fruit and fresh vegetables were out of reach, as was fresh milk in adequate quantities, except so far as it might be supplied through the schools. He asked the Minister of Health to speak on the possibility of health and physique being maintained on such scales as the Government was putting before the House. Sir John Orr's figures showed how high above that 3s. level, which was typical of the conditions of the unemployed in the special areas, were even the minimum requirements set out by him. In his poorest group, Group I, there were 4,500,000 people with an average expenditure of 4s. on food, which was already 1s. a week per head above that of the family he had mentioned. Although this poorest group contained only 10 per cent. of the population of the country, Sir John Orr estimated that it included between 20 and 25 per cent. of all the children in the country, for the obvious reason that the largest families were the hardest hit by the conditions of extreme poverty.

Mr. Dalton added that if he carried that percentage into the distressed areas—Sir John Orr gave no such estimate—he would be very well within the mark and making a most conservative estimate when he said that something between 50 and 75 per cent. of the children in those areas fell within this group who were living on the scale of a family expenditure of 4s. a week a head on food. Sir John Orr had argued that with a diet based on average skill and knowledge it was desirable for the maintenance of health that the expenditure on food should be 10s. a week, against 4s. a head as was shown in this group. The Minister should tell the House whether he, as Minister of Health, recommended to the Government that the scales in the new Regulations were sufficient to maintain the families, and most of all, the young children of the unemployed, in a proper condition of physical well-being.

Sir KINGSLEY WOOD said that it was an important matter to him, as Minister of Health, whether there was any truth in the many statements which had been made in regard to the health and physical efficiency of the people affected by these Regulations. There was an absolute duty on the Unemployment Assistance Board to meet the needs of those who were entitled to look to it for assistance. In the exercise of this duty the Board was limited by no scale, but had complete discretion to give whatever assistance was necessary to ensure an adequate supply of food as well as other necessities of life. The scale laid down in the Regulations was not to be applied rigidly. The Regulations provided that all special circumstances, including, for example, prolonged unemployment, were to be taken into consideration and the amount of assistance varied as necessary. In fact, no other method was possible.

Numerous estimates had been made of the cost of an adequate diet, and there was much difference of opinion on the subject. Undoubtedly the diet of the people of this country could be improved, particularly by increasing the consumption of those articles of food which modern science had shown to be of special value to health. He hoped he would not be misunderstood when he said that merely to increase the scale of allowances under the Regulations would not solve the problem. It was not so easy as that. Sir John Orr showed in his book that, as the income per head of the family increased, only a small part of the increase was spent on food. To him (Sir Kingsley Wood) the only effective way to ensure that the recipients of unemployment assistance

always obtained the dietary best suited to their needs would be to insist that a substantial proportion of the allowance should be given in kind. Such a remedy, with the large measure of interference with the freedom of the individual which it implied, was not likely to be looked at favourably by the House. In the Government's view, the right policy for the improvement of nutrition was that declared in the debate last week. In particular, the Government attached great value to the schemes now in existence for the provision of milk for school children, the provision of school meals, and of free or cheap milk for mothers and young children.

Discussion was resumed on July 22nd and continued till July 24th.

Mr. BATEY read extracts from a report from Spennymoor, which pointed out that illnesses had to be certifiable before the Unemployment Assistance Board allowances could be increased. A cold which lasted a couple of days was not certifiable, but it and other short illnesses required the spending of money. In times of illness the kitchen was turned into a bedroom so that the patient might have the benefit of a fire when bed-clothing was meagre. Mr. GEORGE HALL said the medical officer of health for Glamorgan visited four junior instructional centres in South Wales. He found that 57 per cent. of 530 boys and girls between the ages of 14 and 18, all from unemployed homes, were suffering from malnutrition. Mr. Hall said he could quote many cases where medical certificates were handed to area officers which asked that an additional allowance for nourishment should be paid. In almost every case the officer gave 2s. 6d. or 3s. a week extra, but the allowance for man and wife was so adjusted that the person who asked for the extra nourishment only received an extra sixpence.

The Opposition amendment was defeated and the Regulations were approved by 357 to 155.

In the House of Lords on July 27th the motion of LORD HUTCHISON to approve the draft Unemployment Assistance (Determination of Need and Assessment of Needs) Regulations, 1936, was agreed to.

Fitting of Artificial Limbs

Mr. CHARLETON asked the Minister of Pensions on July 27th if, having regard to the importance of the expert adjustment by experienced surgeons of the artificial limbs required in cases of amputation, as demonstrated by the Ministry's work in war-disabled cases, he could make arrangements for civilian cases to have the benefit of similar treatment. Mr. R. S. HUDSON: Yes. The committee of Queen Mary's Hospital, Roehampton, has specific powers for this purpose under the scheme of the Charity Commissioners governing their funds, and a certain number of civilian cases of amputation have for some time, by arrangement with the London County Council and other public bodies, been successfully dealt with at Roehampton, with the expert advice of the Ministry's surgeons, on the basis of payment for all charges incurred. It would be deplorable if the knowledge and skill developed in this service were allowed to lapse with the decreasing number of ex-service men necessarily coming forward. Accordingly the suggestion of the committee of the hospital that the services of the limb-fitting surgeons of the Ministry, both at Roehampton and in the provinces, should be made available to the committee for the expert adjustment of artificial limbs for further classes of civilian cases submitted to them has been agreed to. Fees which will entirely cover all expenses incurred by the Ministry will be charged, and the service will be inaugurated as early as possible. So far as the Ministry is concerned these arrangements will in no circumstances be allowed to interfere either with the practice of any independent surgeon who may desire himself to supervise the adjustment of an artificial limb in any case in which he has been concerned, or with the supply of artificial limbs by any firm of limb makers that it may be desired to employ.

Measles Not a Notifiable Disease

The House of Commons, on July 27th, considered the Public Health Bill in committee.

On Clause 343, which is the interpretation clause, Mr. SHAKESPEARE formally moved the omission of "measles" from the list of notifiable diseases.

Sir FRANCIS FREMANTLE said he had moved the amendment in the Joint Select Committee on the Bill. There was a great deal to be said for making measles notifiable, but, having inquired generally into its practical application, he found that on the whole it was better to leave the matter as it was, where it might be made notifiable with certain restrictions as occasion required. He approved the elimination of the amendment which he originally moved in the Joint Select Committee.

Mr. CROOM-JOHNSON said that, while we had made great progress in all sorts of directions, we knew practically no more about measles to-day than we did fifty years ago, except that the sequelae were very often all sorts of things connected with eyes and ears. Some of them hoped that this amendment would be left in the Act so that if measles were made notifiable it might direct the attention of a number of people to the necessity for making an extended inquiry into the causes and results of the disease. He hoped that the matter would be looked into again at an early date, and that we should have an opportunity of seeing whether something could be done to stir up public opinion on the subject of measles.

The amendment to delete "measles" was agreed to.

On Clause 347, Mr. SHAKESPEARE moved to postpone the date of the coming into operation of the Bill from April 1st, 1937, to October 1st, 1937. He said that the object of the postponement was to give local authorities more time to frame by-laws.

The amendment was agreed to. The Bill passed through committee and was read a third time.

Tuberculosis-Free Herds and Milk Consumption in Scotland

In the House of Commons, on July 28th, the Vote for the salaries and expenses of the Department of Agriculture in Scotland was considered on report.

Lieut.-Colonel COLVILLE said that tuberculosis, contagious abortion, and mastitis caused heavy losses to the cattle breeder and milk producer. Schemes of investigation concerning these diseases were being conducted in concert with the Agricultural Research Council. The aim of the Attested Herds Scheme was the purification of the milk supply by the eradication of tuberculosis from the dairy herds, for which funds were provided under the Milk Act, 1934. Under the scheme as recently amended a bonus of one penny would be paid through the Milk Marketing Board on every gallon of milk from an attested herd. Previously this bonus was paid only in respect of milk which did not find a market as Grade A (T.T.) milk under the Milk (Special Designations) Order. Financial assistance would also be offered to herd owners to help them to meet veterinary charges for the tuberculin-testing of their cattle and so enable them when their herds were clear of tuberculosis to apply for a certificate of attestation. Other inducements were offered which should combine to make the scheme more attractive to the industry.

The amended scheme also made provision for the co-operation of local authorities and their staffs. It also enabled private veterinary surgeons to be employed in tuberculin-testing. The number of herds in Scotland now attested as free of tuberculosis was 141, and the number of cattle included in them was over 11,000. It was expected that the new proposals would produce a rapid and substantial increase. They had still a long way to go towards the ultimate objective, but the number of herds cleared was not only relatively but absolutely greater than the number cleared in England and Wales.

The cleaning up of the dairy herds was just one, though an important, aspect of the problem of ensuring an abundant supply of pure milk to the people. There was some decline in the consumption of milk in the schools during the winter months, no doubt due, in part at least, to the fact that cold milk was not so popular a drink during winter; but with the return of milder weather there was a considerable improvement in the spring, although the number of children participating in the scheme was well below last year's figure. Under the Scottish Board's scheme during May the average number of children supplied per day was 312,000, compared with 413,000 in the corresponding month of 1935. Of the total quantity of milk supplied during

May over 93 per cent. was Grade A (T.T.). Apart from the effect of weather conditions, various reasons had been given for the reduction in the demand for milk in the schools—such as that the novelty had worn off, distaste for milk, lack of enthusiasm on the part of the parents, and the opinion among senior pupils that milk was fattening. Active propaganda was undertaken by the Board in co-operation with educational bodies with a view to stimulating the demand. Addresses were given to the children at the schools on the value of milk-drinking, and leaflets were distributed for delivery to the parents.

There were practical difficulties in arranging for the assembling of children at the schools to drink milk on non-school days. An interesting experimental scheme was, however, being carried out in Glasgow, where the Board had established four children's milk centres for the sale of Grade A (T.T.) milk at reduced prices for consumption on the premises by children between 2 and 15 years. Very satisfactory results had been obtained during the first two weeks' working of the scheme, an average of about 8,000 children a day having been supplied with milk.

Good progress had been made with the inquiry into the nutritional value of milk, which was organized under arrangements made by an expert subcommittee on behalf of the Milk Marketing Boards and approved by the Minister of Agriculture and the Secretary of State for Scotland jointly last year. The object of the inquiry was to ascertain the effects on health of the consumption of milk in varying quantities and to obtain such further evidence as might be possible on the relative nutritional value of raw as compared with pasteurized milk. In Scotland about 1,500 children attending schools in Renfrewshire had participated in an experiment carried out over a period of one year on similar lines to tests at centres in England. All the medical examinations had now been completed, but preparation of the statistical analyses and full examination of the results of the tests would necessarily take some time.

Sir A. SINCLAIR said it was clear from the reports of experts that an indispensable condition of an adequate nutrition policy was an ample supply of fresh foods, such as milk and vegetables, in which we had an immense advantage over foreign competitors. Of these foods, far the most important was milk. Professor Pattison had stated that if the average consumption per head of milk in Scotland were raised by a quarter of a pint, Scotland would require another 100,000 cows and 10,000 more workers to look after them. Even if that happened, the consumption of milk in Scotland would be only about half the consumption per head in Sweden. If the level of milk consumption in Scotland were raised to that of Sweden, it was doubtful if there would be enough land in Scotland to carry the number of cows required.

The Vote was agreed to.

Gilbert Bain Hospital, Lerwick

On July 28th Mr. KENNEDY asked the Lord Advocate if he had considered the complaint of a patient regarding the treatment received and accounts rendered for that treatment in the Gilbert Bain Hospital, Lerwick, from June 22nd to July 29th, 1933; if he could state the amount of money charged and recovered by the hospital authority; if it was proposed to take any action regarding the charge of perjury and falsification of evidence advanced against the surgeon and matron of the Gilbert Bain Hospital; and if, in view of the fact that this charge had recently been publicly repeated and ignored, independent inquiry could now be made to ascertain the facts relating to the patient's treatment in hospital. Mr. T. M. COOPER said that he had considered the complaint. A civil action at the instance of the hospital authorities against the patient was decided in their favour by the Sheriff Substitute at Cupar, Fife, and this decision was adhered to on appeal to the Sheriff Principal. He was unable to say how much had been recovered under the decree. The complaint of alleged perjury had been investigated fully both by his predecessor and by himself, and no justification whatever for proceedings had been discovered. He saw no need for any further inquiry on this point, and the Secretary for Scotland had no power to review the decision of the civil courts.

Administrative Costs of Health Insurance and Pensions.—On July 20th Sir KINGSLEY WOOD informed Sir Arnold Wilson that the cost of administering the contributory pensions scheme in 1932, 1933, and 1934 represented 5.6, 5.4, and 5.4 per cent. respectively of the contribution revenue of those years. It was not possible to furnish figures for old age pensions as distinct from other benefits of the scheme. In the case of national health insurance in the same years the proportion of the total cost of administration by approved societies, insurance committees, and central Government departments to the contribution revenue was 22.3, 22, and 21.1 per cent. respectively.

Remuneration for Vaccination Duties of the M.O.H.—Sir KINGSLEY WOOD, replying to Mr. Groves on July 20th, said that medical officers of health who had been appointed as vaccination officers were not remunerated by way of fees. An apportionment of their salaries was made in respect of their work as vaccination officers.

Experiments on Animals.—Mr. BALDWIN, on July 27th, told Sir Robert Gower that he could not undertake to afford special facilities during the present Parliament for a Bill to make the vivisection of dogs illegal.

Maternity Hospitals in Special Areas.—Mr. SHAKESPEARE, replying on July 20th to Miss Ward, said that the maternity hospitals in the special areas had recently been visited by medical officers of his Department in so far as this was necessary for the special investigation into maternal mortality now in progress. It was not necessary at present to institute any further inquiry at these hospitals.

Malnutrition of Stoke-on-Trent School Children.—On July 20th Mr. OLIVER STANLEY, replying to Mr. Ellis Smith, said that of 11,842 children in the Stoke-on-Trent public elementary schools submitted to routine medical inspection during 1935, 46, or 0.4 per cent., were found to be suffering from bad nutrition. These figures referred to children in the three prescribed age groups, which contained about one-third of the total number of children. In addition, a special nutritional survey of children of all ages was carried out in forty-five schools during June and July, 1935, and 10,204 children were examined. Of these forty-seven, or 0.5 per cent., were found to be suffering from bad nutrition. These figures did not include children whose nutrition was considered to be slightly subnormal. In the secondary schools only one child was found to be suffering from malnutrition. No information was available with regard to junior instruction centres. He had no reason to suppose that local education authorities generally were not carrying out the recommendations of Circular 1443, which dealt with the provision of meals for children attending public elementary schools. As this circular was not issued until December, 1935, reports of any surveys conducted as a result of the suggestion made in paragraph 7 would not be available until the receipt of the school medical officers' annual reports for 1936.

Local Authorities and Ambulance Depots.—Sir ROBERT GOWER asked whether the Minister of Health, having regard to the number of road accidents and the services voluntarily given to injured persons by members of St. John Ambulance Brigade, would issue a circular to local authorities asking them favourably to consider applications received from branches of the Brigade in their respective areas for the use of sites for casualty stations or ambulance depots, and generally to render such help as might be within their powers, including financial assistance. Sir KINGSLEY WOOD answered, on July 22nd, that he did not think it necessary to issue a circular to all local authorities on this subject. In any case in which difficulty had arisen he would be happy to make inquiries.

An Inhalation Treatment.—On July 29th Mr. SHAKESPEARE, replying to Mr. Rowson, declined to set up a committee consisting of an equal number of medical and lay men to inquire into the efficacy of the "Fingard" inhalation treatment for diseases of the respiratory organs, such as the common cold, bronchial catarrh, nasal catarrh, bronchitis, asthma, and tuberculosis. He was not aware of any sufficient reason for instituting a special inquiry into this method of treatment.

Medical News

The House of the British Medical Association, including the Library, will be closed from 6 p.m. on Friday, July 31st, to 9 a.m. on Tuesday, August 4th (Library 10 a.m.).

The Royal College of Physicians of London will be closed for cleaning, etc., from Saturday, August 1st, to Saturday, September 12th, both days inclusive.

The second International Congress on Gastro-enterology will be held in Paris from September 13th to 15th, 1937, under the presidency of Professor Pierre Duval. The two subjects for discussion are: "Early Diagnosis of Cancer of the Liver," and "Acute and Chronic Intestinal Obstruction," the first being dealt with by French and German speakers. At the end of the Paris congress the International Congress on Liver Insufficiency will open at Vichy on September 16th and continue until the 18th, under the presidency of Professor Loeper.

The second International Congress for the Protection of Infancy will be held in Rome during the first days of October and immediately following the sessions of the fourth International Paediatric Congress.

The annual dinner of the Chartered Society of Massage and Medical Gymnastics will be held at the Café Royal, Regent Street, W., on Wednesday, September 23rd, at 7.30 p.m.

On the occasion of the 550th anniversary of the foundation of Heidelberg University, which was celebrated from June 27th to 30th, the following were nominated honorary doctors by the Heidelberg medical faculty: Dr. Hermann Lundborg, professor of medicine at Upsala; Dr. Hamilton Laughlin, professor of medicine at the Carnegie Institute, Cold Spring Harbour; Dr. Marinos Gerulanos, professor of surgery at Athens; Dr. Otto Naegeli, professor of medicine at Zurich; Dr. Iris Ava, emeritus professor at the Imperial Japanese University at Tokyo; Dr. Alfred Vogt, professor of ophthalmology at Zurich; and Dr. Leon Cardenal Pujals, professor of surgery and rector of the University at Madrid.

The thirteenth annual report of the *Journal of the American Medical Association* on diphtheria states that the diphtheria mortality in the ninety-three cities of the United States with a population of 100,000 or over ranged from 1 for the Middle Atlantic States to 5.58 per 100,000 for the West South Central.

The issue of *Le Bulletin Médical* for June 27th is devoted to the surgery of the biliary tract, and that of *Paris Médical* for July 4th to diseases of nutrition.

The Medical Research Council has appointed Mr. R. Coppock (general secretary of the National Federation of Building Trades Operatives), Mr. Richard K. Law, M.P., and Professor B. A. McSwiney, M.B., Sc.D. (St. Thomas's Hospital) to fill vacancies in the membership of the Industrial Health Research Board.

The National Association for the Prevention of Tuberculosis, with the concurrence of the Governor of Cyprus and in co-operation with Dr. Neff, chief medical officer of Cyprus, and the local health authorities, will shortly open an anti-tuberculosis campaign in the island. It is hoped to make a study of the incidence and mortality from tuberculosis and to assist the public health administration to establish a comprehensive scheme for the prevention and cure of the disease, from which the inhabitants suffer severely. To further its plan of co-operation the association has appointed a medical commissioner and a nurse commissioner for tuberculosis, who will leave for Cyprus in October. The medical commissioner appointed is Dr. Noel Dean Bardswell, who has been in succession medical superintendent of King Edward VII Sanatorium, medical adviser (for tuberculosis) to the County Insurance Committee of London, and officer-in-charge of the tuberculosis section of the public health department of the London County Council. The nurse commissioner is Mrs. N. Jays of the Seamen's Hospital, Greenwich, who has spent much of her life in the Near East, and speaks Greek—the language in Cyprus—fluently.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to **The EDITOR, British Medical Journal, B.M.A. House, Tavistock Square, W.C.1.**

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QUERIES AND ANSWERS

Income Tax

Additional Assessment

"R. D. S." bought a near-by practice in December, 1934, and amalgamated it with his own. The accounts sent in for the years ending March, 1935 and 1936, included receipts from both practices. The inspector proposes to make additional assessments, increasing those already made for 1934–5 and 1935–6. Is this correct?

*** The inspector is acting legally, though it is not apparently usual to make such additional assessments where the increase in net practice income is inconsiderable. Legally the amalgamated practices are a different subject of assessment than the one original practice. From the point of view of equity, the fact is that "R. D. S." has earnings which have been specially increased as from January 1st, 1935, and apart from such additional assessments would not account for tax thereon until 1936–7, and then only on the increase for a quarter of a year. When "R. D. S." sells the practice this liability will, of course, cease as from that date, and the full assessment of the earnings in the early years of the new practice is equitably necessary to offset the advantage he will then obtain.

LETTERS, NOTES, ETC.

Squint and Tuberculous Meningitis

Dr. M. D. RIPKA (London, N.W.1) writes: On June 18th I saw a child aged 12 months, apparently healthy and happy, except that her mother had noticed that she woke that morning with a squint. Suspecting the possibility of meningitis, I referred the child to University College Hospital, where again nothing except the slight external rectus palsy was found, and the child was admitted for observation. A lumbar puncture performed the next day revealed no tubercle bacilli or other micro-organisms; 75 white cells per c.mm.; 0.69 per cent. chlorides; 0.1 per cent. protein; and there was sugar present, not diminished. The child developed generalized spasticity, exaggerated reflexes, and bilateral extensor plantar responses. Lumbar puncture on June 22nd, however, showed the presence of tubercle bacilli, and the child died the following day, five days after the appearance of the squint. At necropsy the brain was found to be soft and flabby, and the meningeal vessels were injected, tubercles being seen along them. There was a small active tuberculous area at the apex of the right lung, and grey tubercles on the surface of the spleen. It is, I think, worthy of note that the single physical sign of a sudden or newly developed squint, even in an apparently

healthy child, may be the only evidence of tuberculous meningitis, and demand urgent and immediate investigation. I wish to thank Dr. W. J. Pearson for permission to publish this note and Dr. J. G. Chappel for details of the case.

Diathermy in Dysmenorrhoea

Dr. H. E. GIBSON (South Godstone) writes: When one reads of the severe and/or mutilating operations performed by gynaecologists for dysmenorrhoea, one wonders how many of the cases so treated could have been cured far more simply with diathermy. Presumably as long as gynaecologists live by the knife and have the surgery complex, so long will they keep that Cinderella of medicine, physical treatment, strictly in the background.

A Leech in the Trachea

Dr. G. G. COOPER writes from Morocco: In September, 1935, a Legionnaire, three days after bathing in a pool which contained small leeches, complained of discomfort in the throat and occasional difficulty in breathing, coupled with a change in intonation of the voice. This continued and became more marked, with a cough and discharge of quantities of aerated bright red blood and phlegm. The patient was evacuated to hospital for observation, and three weeks later one morning on waking he found a small leech attached to the buccal mucous membrane, which he removed and the symptoms disappeared. The leech had been attached in the trachea below the larynx—laryngeal mirrors had revealed nothing—and later found its way into the mouth. I saw the case, which showed no pulmonary symptoms.

Maternal Mortality and the Press

"W. B." writes: The publicity given to the question of maternal mortality is not only having a bad effect on expectant mothers, but is inducing a feeling of nervousness amongst general practitioners. Is this the reason that the number of cases of Caesarean section is going up? The young practitioner does not care to run the risk of an obstetrical disaster, knowing too well how injurious the consequent inquiry and publicity may be to his reputation. No harm would be done if these cases were sent to a maternity hospital, where they would have the services of an obstetric specialist, but in many districts the only provision is the local general hospital, staffed by surgeons with no more maternity experience than they have obtained in general practice. Caesarean section, generally a comparatively simple and always a spectacular operation, provides the easy way out of the difficulty, but what of the poor woman, condemned either to sterility or to an operation at her next pregnancy?

The Rattenbury-Stoner Trial

Miss F. TENNYSON JESSE, whose work on the psychology of murder is a contribution to criminology, has produced a worthy successor to her earlier volumes in the Notable British Trials Series (*Trial of Alma Victoria Rattenbury and George Percy Stoner*, William Hodge and Co., Ltd., 10s. 6d.). Mrs. Rattenbury, a woman of early middle age, engaged Stoner, a young lad, as chauffeur and handy-man, and they quickly became lovers. Her husband was 67, and she had two children. About six months after Stoner joined the household Mr. Rattenbury was attacked from behind as he sat sleeping in an armchair in the drawing room at Madeira Villa, Bournemouth, the Rattenburys' home. The weapon was a carpenter's mallet, which Stoner had fetched from his grandfather's house that afternoon. The patient was taken to hospital and found to have three serious wounds on the head which could not have been self-inflicted. When the police arrived they found Mrs. Rattenbury very drunk. She confessed to the murder, and said next day that she had done it deliberately. The peculiar interest of the trial was the manner in which the evidence against Rattenbury quickly faded away and guilt was fastened on Stoner. The interest of Miss Jesse's book is her sympathetic analysis of the highly coloured personality of Mrs. Rattenbury. She was a Canadian, very attractive to men, and a clever musician. She was happily married to a young Englishman who was killed in the war, and herself served throughout the war as a transport driver. She married again, after divorce proceedings, in 1921, but was unhappy, and married Mr. Rattenbury in Australia, again after divorce proceedings, a few years later. He was much older, and her sexual dissatisfaction was one of the dominant motives of her life, although she does not seem to have had a lover or to have behaved in any abnormal way until she met Stoner. She was an affectionate, kindly, and gregarious person, and a good and loving mother. Her husband was, after his first passion for her, somewhat indifferent and miserly, but the marriage was not particularly miserable. Her attachment to Stoner must have been chiefly physical to start with, but when they were in trouble together she stuck to him unflinchingly and did her best to save him at the sacrifice of her own life, only giving way when it was made quite obvious to her that she could not in any case succeed. As drawn by Miss Jesse, she was in many things frivolous and silly, and she undoubtedly made a disastrous choice in the unstable Stoner, but in her reaction to disaster she showed a strength of character to which, according to the editress, Mr. Justice Humphreys did not do justice, although he did ample justice to all the facts of the case. Miss Jesse blames the judge—if one can call it blame—for identifying himself with the conventional merciless attitude towards persons who forsake the accepted code of sexual morals. According to her, the judge was wrong in three respects: in condemning Mr. Rattenbury as "that unpleasant character, a *mari complaisant*"; in assuming that the middle-aged woman dominated the young lover; and, most of all, in remarking that she was a woman for whom no one could feel sympathy or, indeed, anything but disgust. This contrast between nature and convention makes the drama of the trial, and the reader is left to make his own choice between the naïve integrity of Mrs. Rattenbury, which withstood the extreme of human condemnation and remorse, and the harsh values, voiced by the judge, which govern sexual behaviour in this country.

Sightless Masseurs

The National Institute for the Blind (224, Great Portland Street, W.1) has issued a sixpenny pamphlet (Bulletin No. 10) entitled *Massage as a Profession for the Blind*. "If concentration and delicacy of touch in dealing with surfaces made sensitive by pain are the two outstanding qualities of a good masseur," it is stated, "then the trained blind worker is in a strong position." Many of the cleverest sighted masseurs work with closed eyes precisely because the absence of visible distraction increases their skill. Since its establishment during the war, 264 sightless men and women have been trained at the massage school of the National Institute. Not one has failed, while the large majority have been conspicuously successful after qualification. At the institute's own clinic in the massage school an average of 140 patients are treated weekly by blind men and women; while a few doors away is the Eichholz Clinic, where diathermy treatment, remedial exercises, and a wide balneological system are administered by fully qualified blind masseurs and electrotherapists. Massage is pre-eminently a vocation by which those afflicted with loss of sight can gain not only independence but also a knowledge that they are contributing to the welfare of their fellow men.

New A.A. Itineraries

Members of the Automobile Association who have recently applied for itineraries will have noticed changes in the familiar route sheets. Two years' work involving the printing of 12 million new sheets has been necessary to bring about the numerous improvements from which tourists will benefit this summer. Over 8,000 sketch maps have been drawn and the series of town plans increased by 50 per cent. Intermediate mileages, formerly shown side by side with route directions, are now also indicated on the sketch map of the road being traversed. Specially equipped A.A. logging cars have covered more than 50,000 miles during the past eighteen months while checking gradients, directions, road numbers, and mileages. This has been made necessary by the large number of recent road improvements and the construction of new by-passes, which have considerably altered some of our main highways in contour and direction.

Disclaimer

Dr. DONALD HALL (Hove) writes: Will you please allow me to say that Dr. Pulling, Mr. Beresford, and myself are not in any way responsible for the newspaper publicity which has been given to us lately in connexion with the illness of Sir Harry Preston.

Vacancies

Notifications of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 37, 38, 39, 40, 41, 44, and 45 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 42 and 43.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page 103.